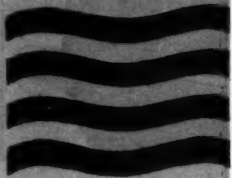




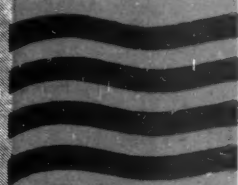
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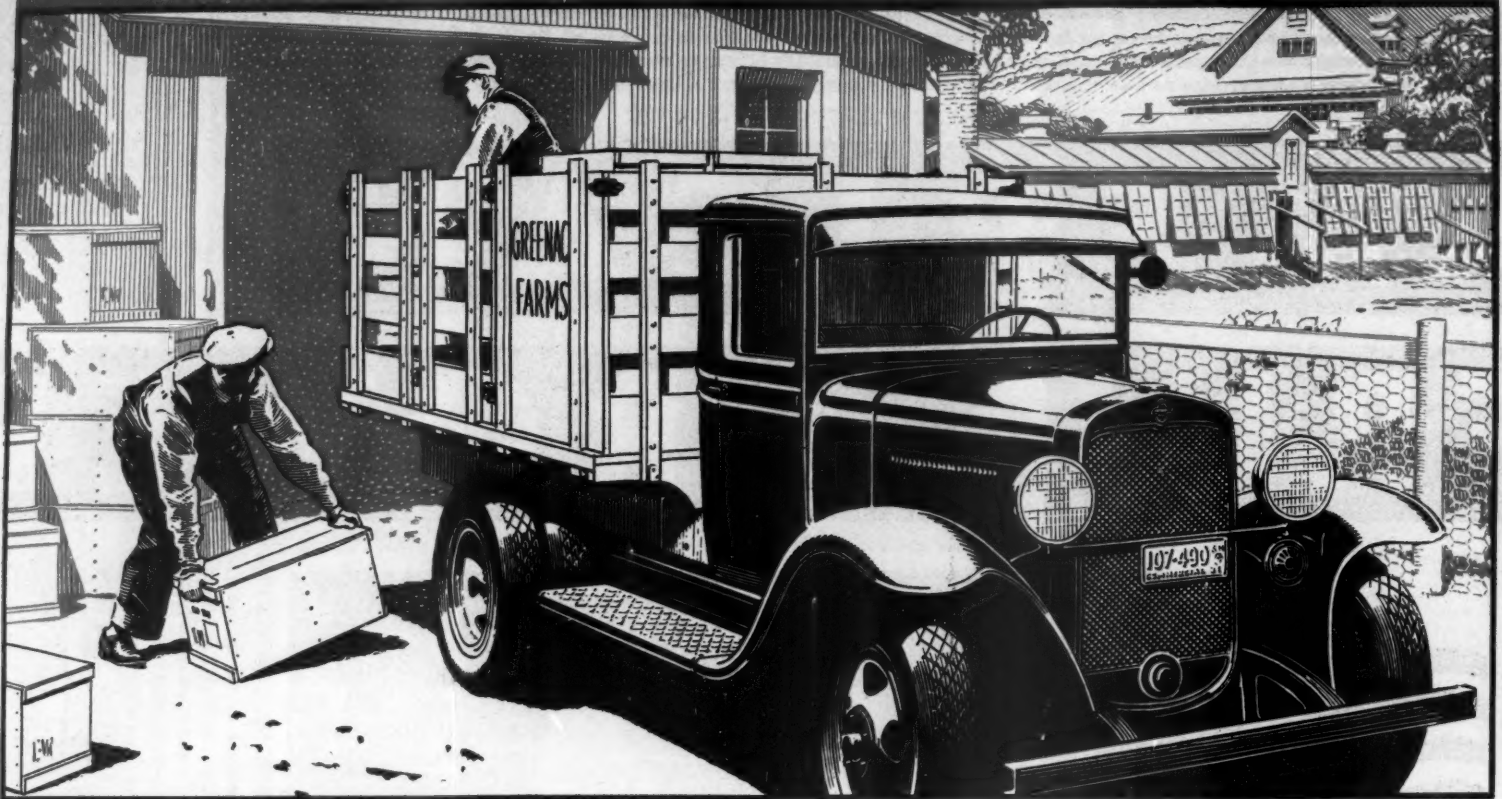
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TRAINING BUGS TO FIGHT BUGS
MOTOR TRUCKS SPEED OKANOGAN FRUIT
AMERICAN FRUIT GROWER WONDER TOUR
WINTER VETCH—THE ORCHARD COVER CROP

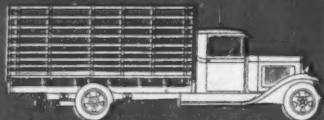


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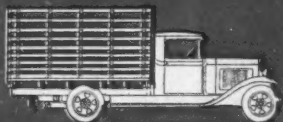
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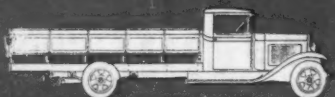
1 1/2-Ton 131-inch Stake Truck—Price complete with Chevrolet cab and body \$710, dual wheels \$25 extra. With 157" wheelbase \$810, dual wheels standard.



1 1/2-Ton 157-inch Stake Bed Truck—Price of complete unit with Chevrolet cab and body \$830. Dual wheels standard.



1 1/2-Ton 131-inch Stake Bed Truck—Price complete with Chevrolet cab and body \$730, dual wheels optional \$25 extra.



1 1/2-Ton 157-inch High Wide Express Truck—Price with Chevrolet cab and body \$900. Dual wheels standard. With 131-inch wheelbase \$715, dual wheels \$25 extra.

1 1/2-TON CHASSIS WITH 131-INCH WHEELBASE **\$520**
(Dual wheels optional \$25 extra)

1 1/2-TON CHASSIS WITH 157-INCH WHEELBASE (Dual wheels standard) . . . \$590
COMMERCIAL CHASSIS . . . \$365

All chassis prices f. o. b. Flint, Michigan.
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FOR LOW FIRST-COST AND GREAT ECONOMY » » »

Chevrolet six-cylinder trucks with Chevrolet-built bodies



The economy of the Chevrolet six-cylinder truck begins with low first-cost. For you can buy a Chevrolet truck with a Chevrolet-built body at one of the lowest prices in the commercial car market. And this economy continues, day after day, throughout Chevrolet's long life. In fact, leading national organizations who use large fleets of trucks find that no truck of similar capacity gives a lower cost per mile than the six-cylinder Chevrolet.

To drivers of Chevrolet sedan deliveries, 20 miles to the gallon of gasoline is a common experience. Owners of the heavier 1 1/2-ton units report gasoline mileages that are equally impressive. And the engine, even after thousands of miles of service, is extremely economical in its oil consumption.

Furthermore, it costs very little to keep Chevrolet trucks in good running order. For instance, a large percentage of Chevrolet six-cylinder trucks have gone 20,000 miles or more without having their engines opened for major servicing. All because of

the ruggedness of Chevrolet-built bodies and chassis—the freedom from destructive vibration that six-cylinders give—and the ability of the Chevrolet motor to deliver high road speeds at low engine speeds.

Today, when everybody is watching costs so closely, farm owners, one after another, are changing over to Chevrolet six-cylinder equipment. With Chevrolets on the job, they are enjoying the lowest transportation costs. And they are obtaining, in addition, higher speed, greater power and larger capacity—with better all-round performance—to handle their trucking more economically!

Chevrolet Motor Company
Dept. 19-B, 420 Milwaukee Avenue, West
Detroit, Michigan

Gentlemen—Please send me complete information about Chevrolet's line of six-cylinder trucks with Chevrolet-built bodies.

Name _____
Address _____
City or P. O. _____ State _____

CHEVROLET SIX CYLINDER TRUCKS

AMERICAN FRUIT GROWER

VOLUME 51

JUNE, 1931

NUMBER 6

PROPER THINNING ESSENTIAL TO PROFITS IN 1931

MANY FACTORS can operate to reduce the number of apples and peaches on the trees ere the 1931 crop is harvested, hence it is too early at this time to predict an over-supply of these fruits.

Bloom has been profuse as a rule, and the set of fruit in proportion to the bloom. Killing frosts have been few and unimportant, considered from the standpoint of national production, and the possibility of crop reduction from this cause appears remote, though of course not impossible.

Due to the prevailing dry weather of last season the carryover of fungous pests seems to be below normal. On the other hand, the mild winter has probably resulted in an abnormally large carryover of some important insect pests. This condition will inspire the careful grower to modify his individual spray program to meet the unusual conditions of the present season.

Under average conditions of temperature and water supply during the growing season, and with good culture and timely and thorough spraying, it is not unlikely that the markets will be supplied with more apples and peaches, particularly apples, than normal consumption can accommodate, even at the lower price levels that are likely to continue to prevail.

Orchardists cannot well reduce acreage, as has been recommended for certain other crops. But they can and should thin. This procedure, nearly always a source of profit, becomes especially important in a season of threatened over-production.

At this writing the set of apples and peaches is overabundant. Barring the occurrence of storms or an excessive June drop, more fruit is now set than the trees are capable of bringing to profitable, merchantable size at harvest. This fruit will be ultimately picked from the trees. If too much is allowed to hang until harvest, high priced fall labor must be employed to pick crops of undersized fruit.

Labor costs are generally lower at this time than are likely to prevail in the harvest season. If, after the June drop, every blemished fruit is removed from the trees and the remaining sound specimens

are judiciously thinned to proper distances apart, a profit on the operation cannot well fail to result, wholly regardless of the price levels prevailing in the fall and winter markets.

Indeed, thinning in a season of super-abundant production may mean the difference between a profit and a possible loss on the season's operations. In such a season only the well-colored fruit of good size readily finds a market at any price.

Proper thinning requires good judgment and an abundance of nerve. More nerve, at times, than many good growers can summon. Not a few of the most experienced growers will perform all other orchard operations with skill and judgment, but admittedly fail of doing a good job of thinning. The removal of blemished apples is easy. But with a heavy set, the ruthless courage required to pick and throw away perfect specimens, leaving the remaining crop properly spaced on the tree, is more than many good growers possess.

A practical expedient adopted by some orchard owners who realize their shortcomings is to hire the work done by help that can be depended upon to follow instructions in regard to spacing. The owner can instruct the help as to the

spacing required—and go visiting, or fishing or engage in some work that will keep him away from the orchard till the job is over.

In some respects thinning fruit is like butchering the pet pig that was started off on the bottle and has grunted and squealed its way into the affections of the whole family by simply being an utter and exasperating nuisance at all times. On a fair day in late fall or early winter, when the family pet has reached the prime pork age, the household goes a-visiting at early morn while a skillful neighbor with a roll of keen-edged cutlery methodically builds a fire under the big iron pot in the back yard.

Returning at dusk, the family misses the accustomed frantic squeals of welcome, but takes solace in the knowledge that the winter table will lack not for sausage and side meat.

ADVERTISING VIRGINIA APPLES

VIRGINIA APPLE GROWERS, through the board of directors of the Virginia Horticultural Society, have sponsored a plan for advertising the apples of that State through a voluntary levy of two cents a barrel.

Many elements that should operate to promote the success of such a procedure are present in the situation. The territory is compact, the graded product presents no wide variations of quality and appearance, and the growers are, to a very large extent, men capable of taking a strictly business view of a business proposition.

The Virginia growers will probably find, ere the proposed plan has progressed very far, that some central authority with supervision over sales will be necessary for best results. This may be either a Virginia sales agency or a State apple pool. The necessity for a "master" trademark may become apparent, for profitable advertising presupposes a specific product for which a market is to be created.

If directed by an advertising agency with successful merchandising experience, and supported by the Virginia growers over a term of years, it will mean wider and more receptive markets for Virginia apples.

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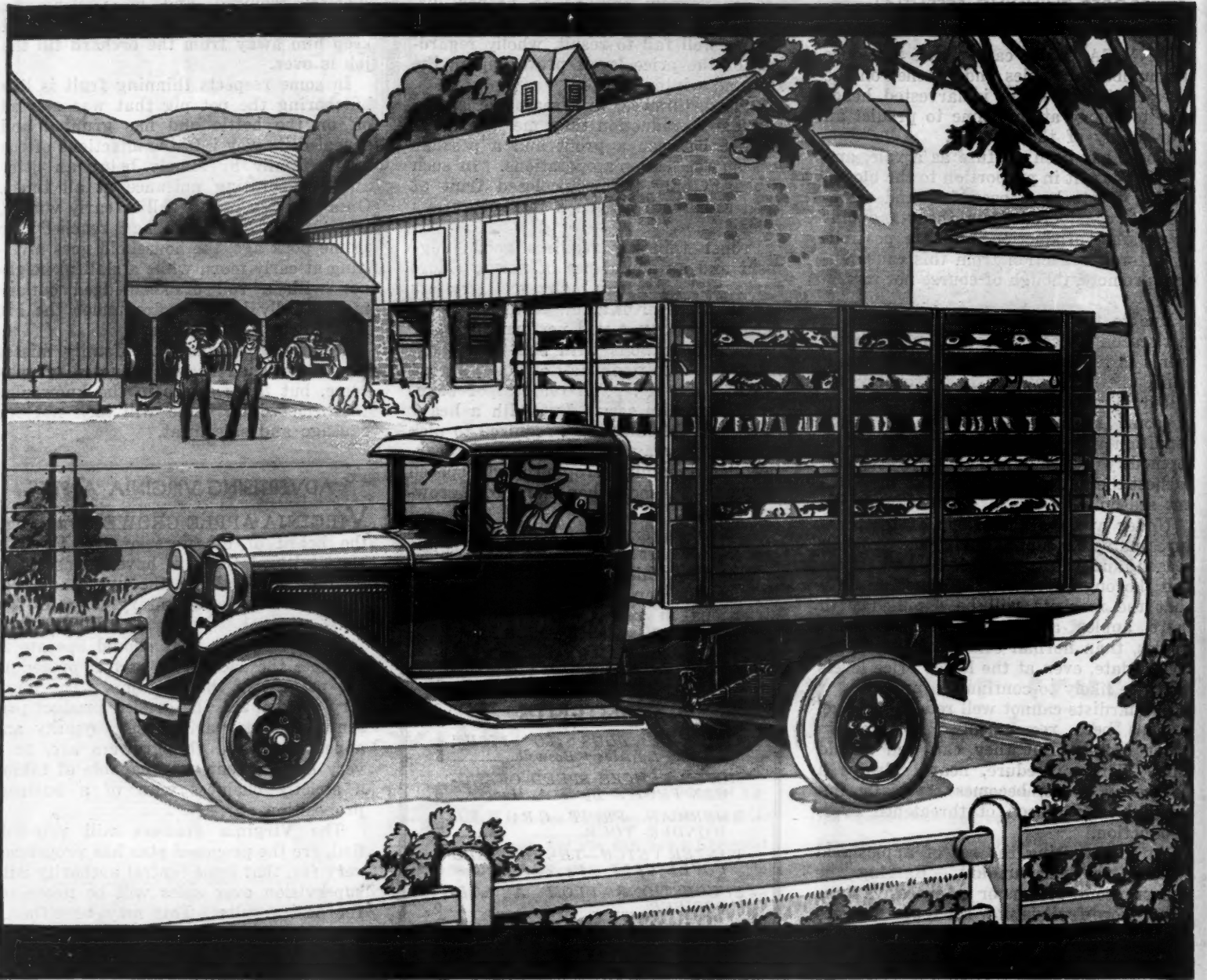
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With a **FORD TRUCK** you can save on every hauling-task



MANY farmers profitably use Ford trucks to extend their marketing range. You learn by radio, telephone, or from the daily reports, when and where to sell your products to best advantage. The nearest market is not always the best market. Often a few additional miles mean higher prices.

The Ford truck brings this favorable market within easy reach. Because of its low first cost, long life, and operating economy, it will cover the extra distance at a minimum cost per mile. The 40-horsepower engine and 4-speed transmission give it abundant power to haul capacity loads, and the speed to cover distances quickly. You will find that these added miles to an advantageous market will repay you with extra profits.

With its spiral-bevel-gear rear axle, of three-quarter floating design, its sturdy frame with five strong cross-

members, its heavy front axle and spring, its medium-speed engine, and its torque-tube drive, which relieves rear springs of abnormal strains, the Ford truck will give long and faithful service for many thousands of miles.

The Ford 1 1/2-ton truck chassis is available with either 131 1/2-inch or 157-inch wheelbase. It can be equipped with stake-sides or cattle-racks, for use on the standard platform body. There is a choice of open or closed cabs, single or dual rear wheels, and high or low rear-axle gear-ratios.

In addition to meeting practically every hauling requirement of the farm — either on the open road or in the field, the Ford truck is also a readily available source of stationary power. This added value comes through the new power take-off which, for a small additional cost, can be fitted directly on the transmission.



It is highly useful and economical for driving orchard sprayers, feed grinders, water pumps, corn shellers, buzz saws, etc.

See your Ford dealer. You may purchase a Ford truck on convenient economical terms through the Authorized Ford Finance Plans of the Universal Credit Company.

Saving in operating costs pays for new trucks

The Farmers Cooperative Creamery, of Sioux Center, Iowa, traded in 13 old trucks for 13 new Ford 1 1/2-ton trucks, in February, 1930. They write that during the first year, the saving in operating expense paid the difference in cost of the new Fords, paid the operating costs of these trucks, and left money to spare. This excellent record is but one example of the definite economy Ford trucks offer. Other operators, everywhere, are receiving equal value.

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TRAINING BUGS TO FIGHT BUGS

By ALBERT BOSWELL

MARK TWAIN once took the conceit out of a head of cauliflower with the remark that it was only a cabbage with a college education.

Were the famous humorist alive today and wise-cracking in the tempo of the stage and talking pictures, he probably would say that the ladybird is only a plebeian bug gone snooty. But there is no denying that ladybirds, commonly known as ladybugs, have occasion for high-hatting the entire insect kingdom. Education has made them snobs in theory, if not in fact.

In some parts of the country, particularly in southern California, the ladybug is held in high esteem. Without the ladybug, the \$425,000,000 citrus industry of the Los Angeles area probably would be nil; without the citrus industry, which pays out some \$8,000,000 annually in wages to pickers and haulers, \$3,000,000 to graders and packers, \$6,000,000 to lumber mills for shook,

glers," are the particular friends of homebrewers, for they make themselves of great use to hop growers by devouring hop-lice. Another kind keeps the squash and melon leaves free of scale insects.

Ladybugs, upon graduation from these schools, are qualified parasite police whose dietary training from infancy up has been such that the ladybug will eat nothing but mealy bugs. In fact, when these parasite police are released for duty their diet has become a fixed habit that cannot be broken. The entire curriculae of the bug colleges consists of diet regulation, and therein lies the value of the graduates to the orchardist and truck farmer.

So indispensable to the life of southern California is the ladybug that poultry

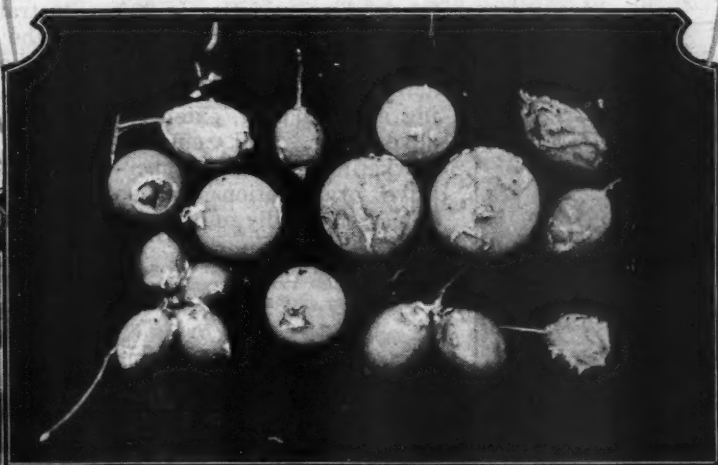
ferent from other members of the insect family that the children soon learn to recognize the tiny creatures, either red or yellow with black polka dots, or black with white, red or yellow spots.

Crows and blackbirds are the chief natural enemies of beetles, but they are also destructive to fruit and do not respect the ladybug. Longfellow, in defending the cause of such birds, said:

"Even the blackest of them all, the crow,
"Renders good service as your man-at-arms,
"Crushing the beetle in his coat of mail
"And crying havoc on the sluggish snail."

Several years ago, through the careless importation from Australia of some infested lemon trees, the mealy bug pest obtained a foothold in the citrus groves of California, Arizona and Florida. In spite of the spraying and "gassing" of trees, the insect multiplied almost explosively because its natural enemy, the ladybug, was not present. Something had to be done—and done quickly—to help set the balance of nature

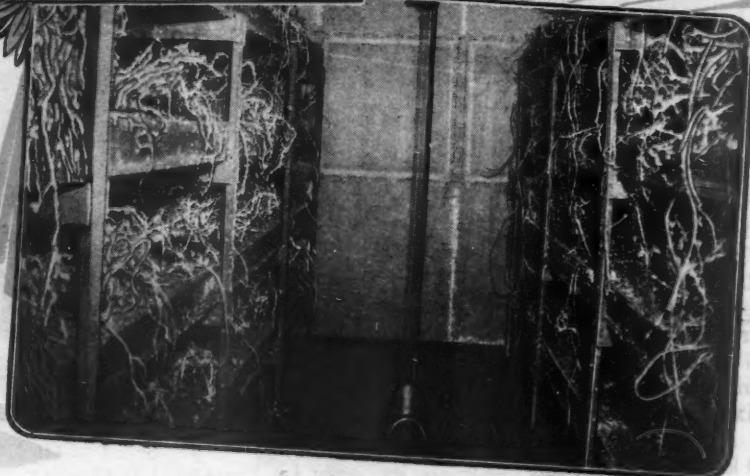
straight again, so several thousand ladybugs were imported from Aus-



Lemons, oranges and grapefruit infested with mealy bug, the smaller white masses. The larger white marks are the *Cryptolaemus* larvae feeding and the round black spots are the adults of the *Cryptolaemus*.

Liberating ladybird beetles and *Cryptolaemus* mealy bug feeders in orange grove of the San Gabriel Valley Pest Control Association by S. H. Essig, Entomologist.

Breeding room. Potato sprouts covered with mealy bug egg masses and *Cryptolaemus* larvae and pupae.



\$2,000,000 to paper mills for tissue wrappers, and \$125,000 for box nails alone, there probably would not be so much of Los Angeles.

Two small southern California towns in the heart of the orange, lemon and grapefruit belt bear the distinction of having schools where the ladybugs are trained to fight pests. Educational institutions for ladybugs are unusual, to say the least, but they confer a great benefit upon mankind, for the bugs prevent the destruction of millions of dollars worth of fruit annually.

The grubs of one species, called "wig-

raisers teach their flocks of chickens not to eat the beetles, and respect for her ladyship is instilled in school children from kindergarten up. In the first and second grades the youngsters are taught to sing:

"Lady bug! Lady bug!
"Fly away home,
"Your house is on fire,
"Your children will burn."

Their first lesson in entomology usually concerns the little benign beetles in order that they may distinguish them from other less valuable bugs. The ladybug, small and nearly hemispherical, is so dif-

ferent from other members of the insect family that the children soon learn to recognize the tiny creatures, either red or yellow with black polka dots, or black with white, red or yellow spots.

Australia has several species of ladybugs, but there is one whose milk, meat, bread and butter are almost exclusively mealy bugs, scientifically known as *Icerya purchasi*, and it is this species that was brought to southern California in order that the schooling period might be reduced to the

MOTOR TRUCKS SPEED OKANOGAN FRUIT

By EDWIN A. HUNGER

THE OKANOGAN VALLEY of British Columbia is one of the most interesting fruit sections in the British Empire, and just as is the case in other important fruit-growing regions, major dependence is placed on motor trucks for speeding the movement of fruit from the farms. A sizable mileage of improved highways in this section greatly facilitates the use of modern motor transport for this purpose. The accompanying illustrations show how this movement of fruit is accomplished with motor trucks in orchard and vineyard, on highways, and at warehouse unloading docks.

The Okanogan district is in a mountainous section of British Columbia, a night's ride from Vancouver. It is an irregular strip of country stretching in a general north-and-south direction from Sicamous

the other chief fruits grown. It is the only section in Canada where apricots are commercially produced. The total value of the fruit crop in 1929 was \$5,107,025, of which about \$4,000,000 was the value of approximately 3,000,000 boxes of apples. From 20 to 25 per cent of the crop is shipped to the British market, and there is a demand also in the United States for the McIntosh Red apple, which has helped particularly to bring fame to the Okanogan. About 50 per cent of the crop is shipped by co-operative organizations, 40 per cent by independent dealers, and 10 per cent by grower-shippers.

An investigation made by the University of British Columbia shows that the average purchase price for good bearing apple orchards from nine to 10 years of age is \$1,091.50 per acre, and the average yield for leading varieties is 280 boxes (40 pounds per box) on a basis of 74 trees per acre. Careful selection, packing and handling, extensive advertising, and efficient marketing through co-operative organizations have helped splendidly to build up

fective in pulling heavy loads over rough soft orchard soil and up steep grades that one now and then encounters in the Okanogan region. Mr. Kidson, who has 17 acres in peaches and apples, hauls the crop of 23 fruit growers besides his own to the co-operative warehouse in Penticton.

Mr. Kidson came from England in 1912. He said his hauling work begins about July 1 when cherries, plums, early apples, etc., are ready for picking. Hauling of late apples continues until about November 10. The illustration shows the truck in a 12-acre apple orchard owned by P. S. Maynard, formerly of London, England, who purchased the land in 1911, cleared it himself, and planted it entirely to late varieties of apples.

J. Findley, of Kaledon, B. C., whose motor truck is shown in one of the accompanying illustrations delivering a big load of apples to the Penticton Co-operative Growers' Warehouse, hauls the output from 30 orchards, totaling 400 acres, to Penticton. He also operates a two-acre apple orchard. During the hauling season, which continues from June to the middle of November, he makes about six trips a day, which average 10 miles each

[Please turn to Page 18]



Left—E. J. Kidson, Penticton, B. C., adds to his income by doing custom hauling.

Right—J. W. Hughes, Kelowna, B. C., has a general purpose hauling unit.



Above—J. W. Barlee of Kelowna delivering a load of apples to the warehouse of the Occidental Fruit Company, Ltd.

Junction, on the main line of the Canadian Pacific Railway, to the International Boundary. Its total length is about 150 miles and it is from two to six miles in width.

For seventy miles Okanogan Lake twists and twines up the valley like a broad river. The orchards, usually 10 to 15 acres in size, are located on small plateaus or benches, as they are called, that spread out above the lake and below the neighboring mountains. Most of the orchards, especially those in the southern half of the valley, are irrigated. The fruit grown in this section is of very high quality and there is a big demand for it, especially the apples, all over Canada and in numerous other countries.

The total area devoted to fruit production in the valley is approximately 20,000 acres, of which 16,000 acres are in apples. Pears, cherries, plums, apricots, and peaches are

a demand for Okanogan apples.

Among the motor trucks illustrated, that owned by E. J. Kidson, of Penticton, at the southern end of Okanogan Lake, is shown in a typical orchard setting. His motor truck has a two-speed rear axle, which provides an extra low-speed range for the tough places. This truck is especially ef-



A load of apples being delivered to the Penticton Co-operative Growers' warehouse at the southern end of Okanogan Lake by J. Findley, Kaledon, B. C.

THRILLS, ADVENTURE, GOOD TIMES GALORE

on the
**AMERICAN FRUIT GROWER
WONDER TOUR OF THE WEST**

16 Days—All Expenses—Only \$275.75 and Up

THIS JOURNEY of 5500 miles covers so much of the wonderland of the West that a book would be required to describe everything we shall see. Reservations are now coming in fast, and a large congenial party of AMERICAN FRUIT GROWER readers and friends is assured.

Starting from the new Union Station at Chicago at 10:30 p. m. on Saturday, July 18, the first evening will probably be spent in getting acquainted with fellow travelers and with the luxuries of our de luxe special Milwaukee Road train. The real sight-seeing will begin next morning as we reach St. Paul and Minneapolis. A few cabins clustered about a chapel, St. Paul's, formed the nucleus around which has been built the capital of Minnesota. The natural terraces on which St. Paul stands give prominence to many of its most beautiful edifices. Early development of motor power from the Falls of St. Anthony established Minneapolis as the greatest flour milling center of the country, a position still maintained. Within the city limits are the Falls of Minnehaha, immortalized by Longfellow, in the poem "Hiawatha."

Leaving Minneapolis' suburban district, our Milwaukee Special runs through an unusually rich farming section of Minnesota, crosses into South Dakota and then into North Dakota. At Mobridge we set our watches back an hour, from Central to Mountain time. Mobridge is a contraction of Missouri Bridge (Mo. Bridge). Here we pick up the famous trail of Lewis and Clark. As we cross the Missouri at this point we will see, to the north, Ashley Island, on which Lewis and Clark camped October 8, 1804, among the Ree Indians. Their trail will be crossed again and again as we travel westward to the mountains.

West of the Missouri, our route stretches for almost 100 miles through Standing Rock Indian Reservations, the land of the Sioux. One of their most interesting communities may be seen at Wakpala, where our train will stop so that we may watch a Sioux ceremonial. This noted tribe has a legendary history indicating its original abode as the Carolinas and recounting the long trek to the north.

From the Indian reservation, we pass through an interesting section of the "bad

lands" and, just west of Montline, cross into Montana. Miles City, which is revealed in a few hours, is a place of great interest. It is the last great "cow town" of the Old West; and a rodeo held in July of each year gives realistic reproductions of the Wild West days.

Hibbard, Mont., in the next county, will afford us the first view of the mountains. Looking to the north and ahead of the train, a brief but charming view may be had of the Big Snowy Mountains.

At Harlowton, Mont., our steam locomotive gives way to one driven by electricity—a giant, 88 feet in length, weighing 567,000 pounds, yet so docile that a touch of the finger in the cab moves the train. Silently, smoothly we glide from the station—the beginning of the 656-mile journey through the mountains. From open observation cars we see a continuously changing picture of deep rainbow colored canyons and snow-capped mountains.

Our Special, continuing westward, climbs to the heights of the Continental Divide, on whose western slope rests the unique city of Butte, the world's greatest copper mining center. Then we come into the scenic Bitter Roots, where often the way is through tunnelled mountains and high above yawning canyon depths. We cross into northern Idaho, with its pine forests, part of the fruitful Inland Empire of which Spokane, Wash., is the capital.

Our first stop is west of Spokane, at Ellensburg, where we visit the great orchards of Kittitas and Yakima valleys. Then, west—

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The upper loop switchbacks of The Milwaukee Road in the Bitter Root Mountains.

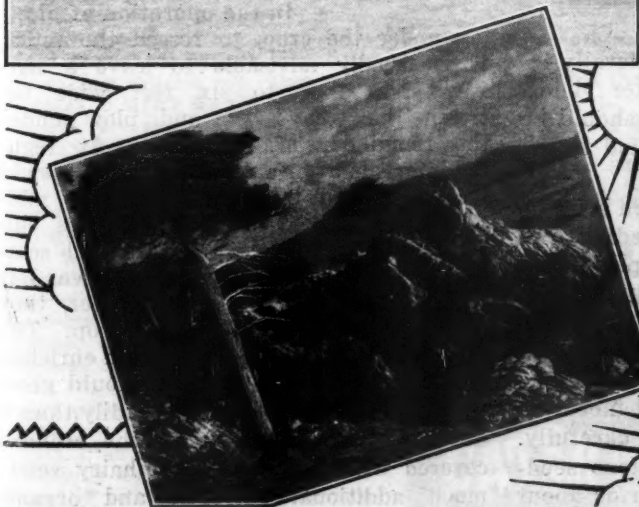


Left—Tourist party, equipped with "tin breeches" and other special clothing, on the snow fields under Pinnacle Peak in Rainier National Park, Washington.

Lower left—Midway Point, 17-mile Drive, Monterey, Calif.

Center—A section of quaint Chinatown in San Francisco.

Right—Colorful entry of matadors, picadors, banderilleros and toreadors just before the fray of man and beast.



WINTER VETCH— THE ORCHARD COVER CROP

By T. J. TALBERT

HOW TO MAINTAIN growth and vigor of young fruit trees and at the same time build up the nitrogen and humus content of the soil constitutes a vital problem in orcharding. The constant decrease of sources and availability of animal manures and the rapid depletion of soil fertility through erosion, systems of cropping and methods of soil handling make the

\$8 and when this is deducted from the above, the value of the annual vetch cover crop will amount to \$22 to \$27 per acre.

In the preparation of the seed bed for vetch, it is very important that the soil be cultivated fairly early, perhaps as early as July. After starting the preparation, light harrowing or disking is important to keep the surface of the soil clean of weeds and grass, to conserve moisture, and to prepare a rather firm and well compacted seed bed. Since hairy vetch thrives well on soils giving a slightly acid reaction, liming is not required unless the soil is very acid. Where there is a lack of fertility, however, superphosphate applied at the rate of

August 15 at the rate of 30 to 40 pounds per acre. It may be either broadcast or drilled. Better results are generally secured, however, through drilling and placing the seed fairly deep in the soil, perhaps as much as one and one-half inches in depth. Harrowing after seeding does not, as a rule, place the seed deep enough in the soil for the best results.

With the proper preparation of the soil followed by careful work in seeding, the vetch should come up and cover the ground evenly by about the first of September. Continued growth of the crop will take place through the fall and winter. Washing and erosion are thus prevented. Soil blowing and the blowing of snow from the field is also stopped.

Deep soil freezing which may damage tree roots is prevented. Perhaps the greatest benefit derived from the overwintering vetch cover crop consists of the effect it has on the physical condition of the soil in the spring. It removes excess water and causes the soil to be in better tilth when plowing is done.

In the spring, winter vetch continues growth and development very rapidly, and about the 20th of May for the latitude of Central Missouri the crop should come into full bloom, at which time it is generally considered the best period for plowing under. This may appear to be a little late for cultivation to start for some orchardists. Since the vetch after plowing under disintegrates very rapidly, surface cultivation may generally be begun within a week or 10 days. Moreover, the organic matter turned into the soil does not interfere materially with the cultivation.

In the operation of plowing under the crop, to reseed the vetch, it is usually advisable to leave a narrow strip four to six feet wide between the tree rows, and plow under the remainder of the crop. At regular intervals after rains, cultivation should be maintained up until about the middle of August, at which time cross cultivations may be given. This will scatter the seed from the strip which was left when the crop was plowed under, thus distributing evenly a new seed crop. The soil already being inoculated and enriched by a previous crop of vetch should grow the second crop much more readily than it did the first. Again, with the orchard covered with a fine cover of hairy vetch, much additional nitrogen and organic

250 to 300 pounds per acre generally increases the set and gives better yields. For best results the phosphate should be applied before seeding or applied in the drill at time of seeding.

It is very important that vetch seed be properly inoculated before seeding and that the work of inoculation be performed in the shade and the seed be kept away from direct sunlight. The light may destroy the organisms applied to the seed in the inoculation process and make the work of no value. The special inoculum for winter vetch should be used carefully.

For Central Missouri conditions seeding for best results is made on or about



A close-up view of a one-year hairy vetch crop.

A good cover crop of hairy vetch on a moderately steep slope containing a light impoverished soil.

Hairy vetch in a young orchard located on a fairly steep slope.



judicious use of leguminous cover crops of great importance in the growing of profitable orchards.

Winter vetch, *Vicia villosa*, is, all factors considered, the most satisfactory leguminous cover crop for orchards in the Central States. According to Barnett, horticulturist of the Kansas Agricultural Experiment Station, an average good crop of winter vetch amounts to approximately 4931 pounds of air-dried tops per acre. In such a crop analyses have shown that the hay contains about 60 to 65 pounds of nitrogen per ton. Orchards, therefore, seeded to vetch may have added to the soil of each acre about 160 pounds of nitrogen each year. If the cost of nitrogen is estimated at 20 cents per pound, the average crop of vetch in the orchard when plowed under places within the soil nitrogen to the value of about \$30 to \$35 per acre. The average cost of drilling and the cost of seed will amount to about

matter may be stored in the soil during another year.

Since young trees may need early and thorough cultivation, the vetch should be seeded so as to allow for cultivation of the tree rows with one-horse cultivation before the crop is plowed under. If for any reason there is danger of serious soil erosion the seed may be sown or drilled in both directions and the cultivation given around the trees with hand tools. Moreover, it is well to keep a space of at least three to four feet cultivated to prevent the vetch plants from vining up the tree trunks and onto the branches.

Summary

The essentials in securing a good stand of hairy vetch consist of the following:

1. Good northern grown seed. Imported seed does not give in general good results.
2. A well-prepared seed bed retentive of moisture and moderately firm and compacted.
3. Special inoculation used only for vetch seed is required. It is important that the inoculation material be secured from reliable sources and that the work be performed carefully and properly.
4. Seeding with a grain drill is preferred to broadcasting. The time to seed for the latitude of Central Missouri is about August 15. The seed may be planted rather deep. When sown in dry soil, the seed will not germinate until rain falls. This may be an advantage in dry periods.
5. Unless the soil is very acid, liming will not be necessary. On "poor" soils, however, an application of superphosphate at the rate of about 250 pounds per acre may assist materially in securing a better stand. The fertilizer may be drilled in at seeding time or applied before seeding.

Suggestions From a Subscriber

I have made a handy device for applying P. D. B. which might be of interest to your readers.

Take a shaving soap container and bore holes half the size of a lead pencil about one-half inch from the bottom. Put the amount of P. D. B. you wish to apply per tree in this container and roll it around the tree. After a little practice, you will be able to accurately apply the material in the desired circle around the tree.

I also have a plan for aerating bulk apples in bins in my home air-cooled storage house that may be of interest to some of your readers. Simply lay lines of four, five or six inch common drain tile eight or 10 feet from the wall to the center alleyway of building, laying strips of any suitable material on the floor on each side of the tile so they will not roll. Care must be taken in laying the tile to see that the ends are about one and one-half or two inches apart.

By this method cold air travels quickly through the apples. I was able to lower the temperature in my storage room, which is 25 by 30 by 12 feet, to 33 degrees during the first week in November. A few days later, after putting in 300 bushels of apples, the temperature was raised to only 38 degrees, while the temperature outside was 55 degrees. By the use of these tile and by keeping two large screen doors and four large screened ventilators in the ceiling open on cold nights, I am able to keep the storage sufficiently cool. Thermometers are placed on both the inside and outside of the storage. Walls, floor and ceiling of my storage are well insulated.

—A. Reid, Kentucky.

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FIRE BLIGHT AND INFESTED BEE HIVES

A CRITICISM by E. R. ROOT
Editor of *Gleanings in Bee Culture*

A REPLY by H. R. ROSEN
University of Arkansas

MY ATTENTION has been drawn to an article by H. R. Rosen on the possible relation of bees to fire blight, on page five of the March issue of your magazine. It is most unfortunate that the headline, "Fire Blight From Infected* Bee Hives," should have been used. Unfortunate because such a heading will scare the inexperienced fruit grower from the use of bees in his orchard when he sorely needs them for the necessary work of pollination, and, more unfortunate, too, in that the consumer of honey will be scared from the use of nature's only concentrated sweet. The apple and pear grower may jump to the conclusion that the good bees may do will be more than offset by the alleged damage. The general public may draw the conclusion that "infected bee hive" means "infected honey," the eating of which will cause disease and death.

I don't need to argue that in many and most localities where there is a shortage of wild bees or other insects, bees must be brought in to insure a crop of more and better fruit.

Blight in orchards is well known, comes and goes certain seasons and even then is seldom a great menace. If blight is absent most of the time and bees are present all of the time, it would seem that they are not the primal cause of even blossom blight or it would be present every year. This fact alone shows that there should be more research work to show why blight develops some seasons and not others.

Again referring to that unfortunate heading, even if a hive may be "infected" with fire blight bacteria, that particular bacterium could not possibly infect a human being; but unfortunately the public does not know that well known biological fact. While believing that bees could carry blight germs, I know that they will not visit a blighted blossom—much less cankers or what oozes from them. They might visit a blossom that is in a normal condition but on which bacteria has been splashed by rain. Bees might then carry the bacteria to the hive but all that would get into the honey would, in all probability, be destroyed.

Sackett of the Colorado Experiment Station in Bulletin No. 252 has shown that honey on account of the levulose content is to a very large extent antiseptic. Levulose is hydroscopic and will extract the moisture from the germs. Germs in the vegetative form are killed in from 10 to 48 hours when immersed in honey, and so is the blight germ.

Gossard of the Wooster (Ohio) Experiment Station, in Bulletin No. 357 for 1922, page 86, says of fire blight in honey, "We were unable to obtain cultures of fire blight from hives in early spring, from either honey or wax and because of its eventual death in honey, we believe it does not exist in the hive at the opening of the season." I happen to know that Gossard was trying in 1916 to prove that bees were the source of infection, just as Professor Rosen is now. Yet Gossard's later work dur-

*In Professor Rosen's original manuscript the word "infested" was used to describe hives and contents containing blight bacteria. In conformity to custom in describing manifestations of insects as infestations rather than infections, the word infected was used in the title of the article—an error, as the bee hives, though "infested" by blight bacteria were not "infected" with blight.—Editor.

ing 1922 vindicated the honey bees.

I now wish to present some evidence, which to me is quite conclusive, showing that bees are not the primal source of blossom blight.

In 1901 serious trouble arose in California between the pear growers and the beekeepers. The former alleged that bees were scattering pear blight right and left and that they would poison the bees unless they were removed. The bee men threatened to resort to the courts if poisons were used. Finally the matter arrived at such an acute stage that the bee men asked me as Editor of *Gleanings in Bee Culture* and President of



Fire blight canker on the trunk of a Jonathan apple tree, photographed April 26, 1926. An illustration of the seriousness of blight at times, even on apples. This tree was eventually killed by the blight.

the National Beekeepers' Association to come and investigate, which I did.

To make a long story short, I pointed out in numerous pear orchards that the young pear trees that had never blossomed were blighted worse than mature trees. Bees would not, of course, visit trees that had never borne a blossom and of course could not have carried the infection. By the same course of reasoning, they could not have been the agency that carried the blight to the old trees. Clearly there must have been something else.

In this connection, Professor Rosen refers only indirectly to bark-piercing insects that were the probable cause of the young pear trees being infected. These young shoots, tender and juicy, would be much more tempting to the insects than the twigs or the older trees.

To prove the matter still further, I persuaded the bee men to move all their bees from a certain infected pear area the following season. This was done in good faith and yet the blight

(To Page 17)

MR. ROOT is in the writer's judgment unduly alarmed at the possibility that the article "will scare the inexperienced fruit grower from the use of bees in his orchard—and that the consumer of honey will be scared—." This assumes a lack of intelligence on the part of the fruit grower, not to mention the consumer of honey, which is unjustified. It may be well to reiterate part of the concluding paragraph of the article which so alarms Mr. Root.

"As a matter of caution it should be noted that even if these findings are duplicated in different parts of the country, this does not mean that bees

horticulturists, some of the plant pathologists, leads me to the belief that he (Rosen) has made a molehill into a mountain," must be most seriously challenged if he implies by this that the disease is not a source of considerable loss. Anyone who is acquainted with the literature of the Plant Disease Survey of the United States Department of Agriculture or with some of the best State reports, such as California and Oregon, will be acquainted with the tremendous losses that are reported from time to time. For example, for the year of 1930 alone, D. G. Milbrath, senior plant pathologist of the California Department of Agriculture, estimated that the cost of the disease on pears in California amounted to \$2,298,000, of which \$855,000 was spent in the spring on control work and \$1,125,260 is the loss occasioned by the blight in reducing the yields. In Oregon F. C. Reimer, who has spent quite a few years in the study of this disease, reports the worst epidemic that the branch experiment station, located at Talent, had ever experienced. In the writer's own observations he has had occasion to note losses ranging from 100 per cent of killed blossom clusters of a Jonathan apple orchard (several hundred good sized trees located near Ozark, Ark., owned by Mrs. A. J. Tubbs) to other orchards of the same variety in which the disease was not serious. Numerous apple orchards were observed during last season in which the loss in reduction of crop was fully 30 per cent.

It must be recognized that unless this disease is controlled more adequately than at present, then those who grow susceptible pears and apples in regions where the disease is common, will be driven out of business sooner or later. To anyone who thinks this statement is a "scare line" the writer begs to call attention to the following report by D. G. Milbrath on the California blight situation in 1930. "Many trees were ruined in certain Counties. There are reports of determination of growers to pull out thousands of trees. It has been estimated by some men who are familiar with conditions that 70,000 trees will be pulled out in Sacramento County. Other estimates have been made for other counties." Statements of apple growers in the Ozarks of Arkansas and Missouri that they intend to quit growing Jonathans, Yellow Transparent, Maiden Blush and several other varieties because of their susceptibility to blight, are quite common. In view of these facts it seems to the writer that it is about time to stop philosophizing on this subject and face the situation frankly. The disease is not being controlled adequately at present.

The writer's work with the honey bee in its relationship to the dissemination of blight is by no means complete and the work is continuing as intensively as in the past few years. It must be conceded that absolute proof for the first spring dissemination of blight, whether it be by the honey bee, by rain and wind, by aphids, by some other agent, or by all of these, is not yet at hand. How many things in science can one mention as being absolutely proved? In the meantime what has our work shown? First, that the fire blight germ is present in bee hives located

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in infected orchards. Mr. Root's idea that honey possesses antiseptic qualities is not borne out by recent work in the writer's laboratory and elsewhere. This will be fully discussed in future publications. Likewise, his idea that because of the writer's ignorance of bees, which is admittedly profound, he has not taken into consideration the fact that several generations of bees would take place between the previous blossoming time and the blossoming time of next season, is not well founded. If he will re-read the article it will be seen that it was the early spring bees, newly hatched, from which the writer obtained infectious fire blight bacteria. The old bees of the past season were not investigated.

Having isolated the fire blight germ from infested bee hives prior to the signs of any new blight on the trees, and having likewise obtained the germs from the bees themselves taken from the hives in the early spring, does this not point rather definitely to the possibility of the honey bee acting at times as a blight disseminator? And, in further view of the fact that the disease has not been controlled by current remedial measures, which is the best policy to adopt, to wait five or 10 years until all the evidence is in, or to make known the results of the investigations conducted up to the present, indicating clearly their possible significance and calling attention to the fact that the evidence is not as yet complete? Surely it will be admitted that fruit growers deserve some consideration in this matter. Furthermore, if the writer's future work does not bear out his present ideas, the results will be published just as they have in the past. The writer has no interest in proving or disproving anything about the honey bee save that he is trying very hard to find out how the first spring blight gets its start in order that we may be in a better position to fight that scourge that has driven the pear industry out of business over large sections of the country, and is now threatening to do the same thing to certain apple varieties.

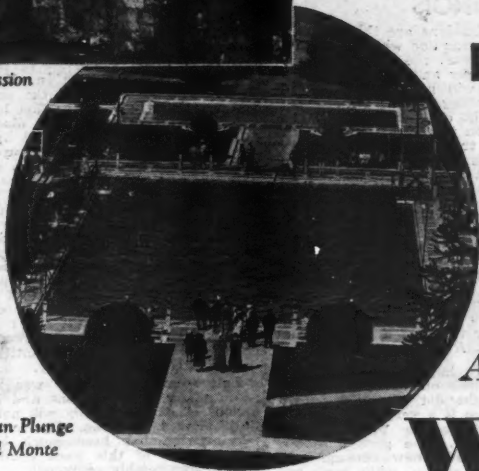
Finally, it is necessary to call attention to the fact that while Mr. Root has presented evidence to show that fire blight was present in certain regions of California in the absence of bees he at the same time admits the following: "I don't deny that the bacteria can be found in the hive or that a few bees might carry the infection; but the hive would have to be in a very badly blighted area to get any germs at all and this is where Rosen says he did get them." It is also necessary to point out that in addition to bees carrying the germs to susceptible blossoms, the writer has presented two other possible sources of overwintering bacteria, one in cankers on the trees, which frequently results in cone-shaped areas of infection, and another, not mentioned, for which experimental evidence is still wanting. Surely it is to the advantage of the bee interests themselves, not to mention the fruit growers, to recognize the advantages as well as the disadvantages which may be involved in the use of infested hives. Even if the present ideas are eventually found to be erroneous, it seems to the writer that it is more worth while presenting them, especially in view of the awful epidemic of 1930, than to sit idly by and do nothing.

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THE FRUIT SURVEY

THE REPORTS in this issue, which follow, are supplementary to those appearing in May but which were received too late for insertion in that issue.

It is well to bear in mind that all of these reports deal with conditions as they appeared during the middle and latter part of April and in early May and that late spring frosts might alter entirely the conditions as pictured, especially in the northern States.

ARKANSAS

Faulkner County. The outlook for peaches and grapes is the best that we have had in this county. We do not raise any apples, strawberries and pears, but the peaches and grapes have been well cared for, pruned, sprayed, fertilized and cultivated, and the outlook is for about 30 cars, compared with eight cars last year.—*W. L. Hall.*

CALIFORNIA

Sutter County. This is a large fruit county, growing peaches, pears, almonds and grapes. All of these crops are about normal. Short irrigation so far has not affected the condition of the trees and diseases have been quite well controlled. Orchards were quite well taken care of last season.—*R. H. Klamt.*

Ventura County. The rainfall in this county this year approximated about 10 to 11 inches, with a penetration of moisture of two feet on very heavy soils, to about five feet on sandy loam, with an average of three and one-half feet on loam types of soil. This is inadequate for dry-farmed orchards to produce a crop and prepare the trees for next year's crop. The apricot crop, of which we have about 8000 acres, is considerably less this year than last. It is probably not over 30 to 40 per cent of last year's crop. It is our understanding that the crop is much heavier in other sections of California, although there is still the possibility of frost injury, and the heavy crop will probably be materially injured by the general drought situation. Because of the drought situation, it is a good thing that we do not have a very heavy crop this year.

You mention the influence on diseases. Drought always weakens the trees, resulting in a certain amount of drying out of fruit spurs and buds. We can expect some of that. As to the underground water supply, this county is very fortunate in having a very extensive watershed, supplying water to the underground reservoirs. We have had a lowering in water table, but we are in a better position than most sections of California. We have in Ventura county in the little Santa Clara Valley what is termed the "Santa Clara Valley Conservation District." Flood waters are diverted over gravel and sands to replenish the underground water supply. This is doing much to maintain our supply. All of the lands of this valley are taxed to support this enterprise. It amounts to only a few cents per acre but it certainly is well worth while.—*V. F. Blanchard.*

COLORADO

Garfield County. We did not have any drought in this section to injure the fruit spurs and so far as I know we do not have any blight, scab or curl. We are bothered some with worms, for which we spray from one to three times, and I imagine we will have the normal number this year. I do not think the ground water supply will be deficient as all our fruit is raised under irrigation. There will be a very small amount of new acreage coming into bearing this year. No orchards are being abandoned that I know of and the growers continued to care for their orchards last year as usual.—*A. V. Lough.*

La Plata County. The fruit crop looks promising. There is a small amount of codling moth injury, and growers gave their orchards good culture and spraying last season.—*W. B. Smith.*

CONNECTICUT

Litchfield County. Fruit spurs seem to be fairly full this spring. From what I can find, the drought did not seriously injure their formation. Scab spores are beginning to show quite early this year. Curculio is the only insect which we worry about and which may carry over. We are deficient in ground water supply at the present time. No orchards of material size or what you call commercial orchards are being abandoned. There will be some new acreage coming into bearing this spring.—*R. P. Atherton.*

GEORGIA

Bibb County. Peaches: Good crop of fruit spurs; last summer's drought did not affect late growth; carryover of diseases, such as blight, scab, curl, was normal; insect carryover normal up to date; curculio begins stinging second week in April; ground water supply efficient; no new acreage will come into bearing this spring. Several orchards were abandoned as unprofitable. Growers did not give orchards culture in the spring, the reason being that a good many were discouraged last season.—*D. F. Bruce.*

Coweta County. This is a commercial peach section, there being about 250,000 bearing trees around Newnan. About 700 cars were shipped last year from Coweta county and 200 more from the upper part of Troup, which is really a part of the Newnan section.

Production forecasts for this season vary considerably but the best informed observers

think the total crop will be about the same as last year if conditions are favorable for the remainder of the season. Some orchards will bear much heavier but those which bore a heavy crop last year will probably have a heavy May drop this year and the final crop will be lighter.

The trees in this section have been well cultivated and fertilized. There is ample moisture and growers are giving the trees the best of care. Insects have been very scarce so far. No new orchards will come into bearing this year and none abandoned. Some orchards that were practically abandoned several years ago are being brought back. This work was started last year.

The worst disease we have had to contend with has been bacterial. This seems to yield to the new zinc sulphate-lime treatment, and most of the growers are using that material in their sprays this year. We seemed to get excellent results with it.—*D. F. Hangerford.*

Doyle County. The fruit grown in this county for commercial purposes consists of two peach orchards. One of these orchards is in excellent shape and will bear a very good crop this year barring hail or storms. The other is passing out with a new orchard set to take its place that will come into bearing in two years. There are also two other new orchards set last fall of around 100 acres each.—*L. H. Nelson.*

Monroe County. The severe drought in this county did not prevent the setting of a rather heavy crop of fruit, especially peaches. The carryover of diseases and insect pests does not seem to be abnormal in any way except that the curculio was unusually late in coming out of hibernation this spring, justifying the omission of the first spray for its control.

Some orchards have been abandoned, but those that have been kept up were given better than the average cultivation in winter and early spring. Spraying and dusting schedules are being adhered to strictly, with the omission of the first spray for curculio by a majority of growers.—*H. G. Wiley.*

ILLINOIS

Adams County. Indications are that we will have a bumper apple crop and while we do not raise very many peaches, the peaches up to date have bloomed freely and if nothing happens to them there will be a good crop of peaches. The same thing is true with pears. Last summer's drought did not seem to have any injurious effect on the formation of fruit spurs in the case of tree fruits. We seem to have had considerable carryover of San Jose scale and some blight and scab. The men in this county are preparing to use tree bands for protection against codling moth, a thing that is new in this territory.

I do not believe there are very many orchards being abandoned. Apple crops have been good the past two seasons and prospects are good now, although the price is not as high as it was. Our larger orchard men continued the regular spraying operations. We will perhaps have 200 or 300 acres of apples come into bearing for the first time this year in this county.—*S. F. Russell.*

Calhoun County. We have the best bloom that we have ever had on our fruit trees. Last summer's drought did not affect fruit spur formation. There is a very slight carryover of diseases, but codling moth is the heaviest in our history. The ground water supply is deficient. Some new acreage will come into bearing this spring, while some orchards are being abandoned. The growers gave their orchards fairly good culture but let up on their spraying a little because of the tolerance.—*J. H. Allison.*

INDIANA

Aurora. We have a good prospect for apples, peaches and pears in Dearborn and Ohio counties. However, we are not just sure what effect the recent frost will have upon same. There is a fair prospect for small fruit, such as strawberries, raspberries, etc. Our orchard men gave their orchards fairly good care last year. We have been having some very good rains during the month of April but are still somewhat short of the normal monthly rain supply.—*C. C. Madison.*

KENTUCKY

Floyd County. There is a good thrifty growth of fruit spurs, and since we had a very mild winter and only a very few farmers sprayed their trees, there is a large carryover of diseases. I have found serious peach tree borer injury in orchards this spring. The San Jose scale does not appear very widespread, however. A small amount of new acreage will come into bearing this summer. The prospects for a crop are the best in four years, as the freckles are over and the fruits are making a good growth. The supply of ground water was extremely low until the spring rains came. The water table is rising and there should be no trouble from that source this summer.—*S. L. Lebell.*

Hardin County. We have one of the biggest crops of blossoms ever on record and apparently there were no ill effects because of the drought. It seems that the carryover of insects and diseases is less than that of an ordinary year. Curculio is present only in very small numbers. Very little new acreage will come into bearing this year. On the other hand, very few orchards are being abandoned as unprofitable. Because of the encouraging appearance of fruit blossoms, growers seem to be taking more interest in their trees than in former years. There have been more requests for spraying information this year than ever before.—*T. E. Ford.*

MAINE

Oxford County. We had no serious drought last year and fruit spur formation is good on

most varieties except Baldwin; very good on McIntosh, Wealthys and Spys. We are an old orchard region with comparatively few trees being planted each year so that there are more orchards being abandoned as unprofitable at the present time than there are young trees being planted. However, we have about 8000 to 10,000 trees non-bearing at the present time.

Last year was a tough year for disposing of mediocre fruit such as is produced by many of our older small Baldwin orchards and it led to further neglect from the cultural and spraying standpoint. We expect a good production of high quality McIntosh in the orchard area around South Paris, Norway and Buckfield. Approximately 25,000 barrels of apples are produced in this area yearly.—*D. H. Ridley.*

MASSACHUSETTS

Essex County. Apples in excellent condition. McIntosh better than last year, Baldwin much better. Peaches coming along nearly as well as in 1930. Pears about the same as in 1930. Probably scab will be less—the temperature is low. Maggot and curculio last year were heavy and are likely to be heavy this year.—*F. C. Smith.*

MICHIGAN

Allegan County. We have had two frosts lately but nothing has been injured. The critical stage is nearly past as far as the fruit is concerned, unless we get a frost next month, which is too far away to be concerned about at this time.

People who took care of their orchards had no difficulty with drought injury last year. In some sections the February frost of a year ago left some blackhearts, but prior to last year it lacked this organic matter in the soil, but in cases where the organic matter was in the soil, it did not injure the fruit trees to any extent in this county. The presence of organic matter in the soil seems to furnish plenty of moisture for fruit spurs and the growth was practically as much this past year as in previous years, but many of them neglected to incorporate organic matter in the soil and their orchards may have showed it this year.

We did lack moisture in all of our soils. I checked over a few of the orchards and I will say that the orchards that have done well did not carry over as much disease this year as they have previously, and by following a good spray schedule they will produce as large a crop this year as they have ever produced before.—*A. D. Morley.*

Wayne County. To date indications are that those apple orchards from which normally a crop could be expected will show an average or better production. A good crop of peaches was produced last year and it is expected an equally good, if not better, crop will be harvested this year. Production of pears is very limited here and in what few orchards exist a better crop than last year is expected. Grapes and small fruits are reported to be in good condition, but the quantity produced is limited and absorbed locally.

Last summer's drought was not so severe as in many other sections and if it had any serious effect it probably will not be indicated until after blossoming. Up to now moisture precipitation has been much below normal, but if rains of this week continue, the loss will be appreciably recovered.

Fungous and bacterial diseases were well controlled last year by combination of favorable weather, and, in the commercial orchards, by spraying. Unless excessive rains are experienced during the critical pre-blossoming and blossoming periods, diseases should be well controlled this year. As most commercial growers follow aggressive spraying programs, insect control will also be kept fairly well in hand.

Practically the only orchards that have been abandoned are those on properties affected either directly or indirectly by real estate acreage or subdivision activities. Acreage coming into bearing is relatively unimportant.—*L. M. Eaton.*

NEW JERSEY

Atlantic County. Apples: Crop prospects considerably below last year, partly because of last year's heavy crop and partly because drought limited fruit bud formation, especially in higher orchards. Peaches: A full crop in prospect on all varieties to date. Crop was practically 100 per cent failure in this county last year due to very severe freeze in February followed by heavy frost at blossoming time. Pears: No commercial crop in this section. Bloom appears normal in scattered plantings. Grapes: Crop grown mainly for local consumption. Last year's growth was ample for normal crop this season. Strawberries: Many plantings below normal because formation of runners was restricted by drought last year. Raspberries and Blackberries: Condition practically normal in heavy producing section around Hammon. Crop prospects good if favorable weather prevails during fruit bearing period. Crop easily affected by drought as plantings are mostly located on sandy soil of poor water-holding capacity.

Apple scab and brown rot of peaches are principal diseases causing losses in this section. Fire blight and apple rust were very bad last year. European red mite infestation appears very light this year and apple aphids much less prevalent than last season. Curculio causes substantial losses each year. Most growers took fairly good care of their orchards last summer, although somewhat less spraying and cultivating than normal was done. Ground water supply is still deficient, many deep wells still being dry or having a greatly reduced water level.—*Hugh Ross.*

Cumberland County. Peaches are set for a heavy crop and the early blooming varieties

are now in full bloom. The set of apple buds is fairly heavy, especially on varieties which were not overladen last year, such as the early varieties and Red Delicious. Staymans and Winesaps, which were heavily loaded last year, are only fairly well set this year.

The carryover of blight is heavy in a good many orchards. There is quite a carryover of scab. Scale seems to be on the incline. Leaf curl is not serious. The ground water supply was deficient until about two weeks ago when rains replenished it. We have not had any rain in about 10 days and most truck crops would respond to a shower. The acreage of bearing fruit is unchanged. Most orchardists took good care of their orchards last year.—*D. M. Bobbitt.*

NEW YORK

Cayuga County. Fruit spurs were not very badly affected by last year's drought, because we did not get our dry weather until late in the season. I think the carryover of diseases, such as blight, scab, leaf curl, etc., was normal, with insect carryover about 95 per cent of normal. The ground water supply was extremely low up until about a week ago. About 25 acres of apples are coming into bearing this year for the first time, and at least 30 acres of orchards have been abandoned or cut down. A few orchards were neglected during the latter part of last season, but on the whole, spraying and cultivation were rather complete. Over 90 per cent of the fruit in this county consists of apples and pears, and conditions as of April 1 were practically normal.—*C. L. Messer, Jr.*

NORTH CAROLINA

Burke County. Principal fruits grown: apples, peaches, cherries, grapes. Bloom unusually good, apparently not affected adversely by drought. Ground water apparently sufficient for immediate needs and it is believed that with a normal season from now on a good crop will be harvested. Growers optimistic.—*R. L. Sloan.*

Haywood County. The drought does not seem to have damaged apple spurs. The bloom buds are late and seemed a little small, but it now seems we will have an abundant bloom. Scab is our chief enemy. The weather for the next three weeks is the all-important factor as to scab. Growers are now putting on the pink spray. Blight caused some injury last year, but have no basis for estimating outlook for this season. Until three weeks ago our ground water supply was quite low. We have had snow and rains since to fill the soil until springs and streams are normal for the first time in 10 months, so I believe the hazard from this cause is probably passed. A few small orchards are just coming in but these will be no more than replacements. Probably almost no net change in bearing trees. The orchards received normal treatment as a rule last year.—*J. L. Robinson.*

OKLAHOMA

Marshall County. Peaches, apricots, pears and early apples all killed by late frosts. Cherries were damaged some. Grapes and some apples apparently all right. Very few farms in county have home orchards properly cared for. Very little disease present, such as curl, scab, blotch. Some blight but not much. Soil moisture plentiful at present but of little value to fruit since so much of it was frozen.—*G. K. Terpening.*

OREGON

Union County. It is my judgment that last summer's weather conditions seriously affected fruit spurs. I expect less bloom for apples, sweet cherries, pears and plums, which are our chief fruits. We expect more insects to winter over but have no serious diseases in this section.

The ground water supply is deficient but was increased considerably by late March rains. There will be a small new acreage of sweet cherries coming into bearing. This will, however, be offset by loss of trees as a result of the winter of 1929-30.

Our orchardists are working under tight financial conditions but are giving their orchards good care as to cultivation, spraying, pruning and fertilization. Most of the apple crop in this section is of superior keeping quality and was largely marketed last year in the export trade at satisfactory prices. The sweet cherry crop was divided about equally between the fresh fruit market in large eastern cities and the west coast canneries. Prices received ranged from four to eight and one-fourth cents per pound net at the home packing house.—*H. G. Avery.*

Wasco County. Last summer's drought has apparently not seriously affected fruit spur formation in this county. The carryover of diseases, such as scab, curl, etc., and insects, is not indicated to date to be any worse than normal. The ground water supply until the last month or six weeks has been very deficient. Since then we have received considerable rain and conditions look favorable at present. The growers last year gave good culture and spraying throughout the season.—*W. W. Lawrence.*

PENNSYLVANIA

Adams County. Apples are budding up in fairly good shape, with the drought not doing as much damage as was anticipated. Stayman Winesap and Black Twig are quite spotted, while York Imperial is heavily budded on an average. Peaches are well budded and are coming into bloom at this time and a big crop can be expected if frost will not interfere. Pears and grapes have no commercial importance, nevertheless in a small way the outlook is promising. Strawberries and other small fruits seem to have been hard hit and the stands of plants are poor.

Regarding disease conditions, blight seems to be more general throughout the county, and scab is performing very abnormally, with only a small percentage developed to give trouble at this time. Insect problems center around the codling moth, which is exceedingly heavy. Bud moth and case bearers are generally rather numerous, with the red spider decidedly less than normal, probably due to dry weather.

The ground water supply is decidedly deficient and many growers are facing a shortage of water to carry on their spray operations. I believe that a 10 per cent increase of new acreage will come into bearing this spring. Very few orchards are being abandoned, although several large orchards have gone into the hands of the receiver due to light crops, the last few years especially. Improved cultural methods and better spraying are in evidence and although some of the growers were very much discouraged, they were able to see fit to give their orchards good care.—M. T. Hartman.

Bedford County. The drought last summer did not seriously affect the formation of fruit spurs on apples and peaches. Other fruits are not important in this county. No difference has been noticed in carryover diseases with the exception of apple scab, which has been delayed in its development to the extent that northern parts of the State have had mature brown spurs earlier than southern counties in the drought area (advice from extension pathologist).

The ground water supply is normal at present. Not much new acreage coming into bearing this spring. Growers gave their orchards fairly good culture and spraying last season but discouraging prices will cause some to let down on expenditures this year.—L. R. Mollenauer.

Eric County. In the case of tree fruits, the drought of last summer would affect the fruit spurs in that they are smaller and the buds are smaller, but apparently there are as many. The carryover of diseases, without any doubt, was less this year than the average, especially apple scab and cherry leaf spot. As to insects, red mite was very bad last year in the county but this year we are able to find scarcely any at all. Aphids, which are now hatching, are fewer in number than in the past several years.

Due to recent heavy rains, the ground water supply is not very seriously lacking. Quite a large acreage of new cherries will come into bearing for the first time this spring. No orchards have been abandoned recently because of being unprofitable. The growers gave their orchards very good care during the past season but this is not the case in regard to vineyards. A large percentage of vineyards are yielding less each year because of the low price on grapes. The fruit men are more interested in small fruits, like berries, than ever before. They apparently are planting these because of the lower income from such fruits as grapes.—P. S. Crossman.

SOUTH CAROLINA

Chesterfield County. Peaches: The prospects for a peach crop were never brighter than at this time. More attention has been given to the care of the orchards than ever before. Spraying for worms is in progress at this time. Quality fruit is the aim of every grower.

Dewberries: This crop is very promising as it has always been. The prospects for a crop are good. The plants are in full bloom at this time. This crop has always been a paying one. The acreage to the crop is being increased. Considerable time of the county agent has been spent in the promotion of this crop. Other fruit and truck crops, such as plums and grapes, are in excellent condition.—W. J. Tiller.

SOUTH DAKOTA

Lawrence County. We had 70 degrees temperature one day and 10 below zero that night, which did a great deal of damage to fruit trees. We had a good amount of moisture last summer and the ground water supply is not very deficient. There is no new acreage in bearing this spring, although there is considerable planting as the orchards around here are very old. We usually produce about 50,000 boxes of apples.—H. M. Critchfield.

TENNESSEE

Blount County. Frost has done no damage. There will be a few carloads of strawberries shipped out of the county. The vines are setting fruit nicely at this time, with prospects of good yields. Some blight has showed up, and there is the usual amount of peach leaf curl. At this time the ground is full of water with wet-weather springs running.—F. G. Vickers.

Campbell County. The fruits commonly grown in this county to any extent are apples, peaches and strawberries. These fruits have had abundant bloom this spring, and fruit is setting well. At the present date there has been no frost damage. Indications are that scab and curl are about normal in their extent. Insects seem fairly plentiful, particularly curculio. Water has been very deficient but recent rains have been ample to thoroughly wet the subsoil. Little if any new acreage will come into bearing this spring. Orchards generally were neglected last year but are being taken care of this year.—F. T. McFee.

Johnson County. Fruit spurs formed in sufficient quantities for good crop. Some injury by drought but not material. Carryover of blight, scab and brown rot apparently heavy in some few orchards. Mild winter allows prospects for plenty of insects this year. Ground water supply deficient until two months ago. Since we have had heavy and abundant rains. Not entirely and wholly saturated but sufficient for excellent prospects for a good crop year. Some few orchards to come into bearing. Very few commercial orchards in this county. Late freezes got a great deal of fruit last year. This discouraged proper spraying and treatment. There was about a fourth of a crop.—W. P. Davidson.

Meigs County. Fruit spurs seem to be strong and plentiful. The drought did not seem to injure their formation. Lack of usual care seems to be responsible for an increase in disease and insect carryover. Blight seems to be less this year. Ground supply of moisture is less than normal. Springs are low or not running. No new orchards will come in this spring. Several peach orchards are abandoned as unprofitable. Strawberry insects seem to be plentiful, especially the weevil. We have thin rows due to drought but the plants look strong.—W. A. Shadow.

TEXAS

Eastland County. The fruit crop was entirely killed by the recent freeze of 22 degrees. Pecan crop also total loss. Spraying has never been carried on in all groves; usually is started in some orchards but if there is a killing freeze this is stopped. R. E. Barker of Ranger made an effort to protect his 60-acre grove from cold weather by installing gas heaters throughout the grove. Having several gas wells on his place, his only expense was the installation of pipe and burners. This recent freeze was accompanied by a high wind which carried the heat through the grove without its reaching into the body of the trees. His loss is estimated at 75 per cent. There is a large acreage of native and improved pecan groves in this county which produces a commercial crop. The freeze killed back many of the small branches and fully 95 per cent of the crop.—J. C. Patterson.

WASHINGTON

Cowlitz County. We have only strawberries as a commercial crop in this district and present indications are that we will have a normal crop. Our moisture conditions for the strawberry districts is normal. We have had a rainy season following an early spring. However, the berries are just beginning to bloom and I think little damage if any has been done by the rain. The cultural methods for the strawberries last season were very good and the plants are in good thrifty condition. The growers are treating regularly for pests and are not having any serious trouble from them at present.—C. S. Anderson.

Kittitas County. Quite extensive plantings of apples and pears in this county have been reduced to about 500 acres—mostly apples—all of which are irrigated.

Development of fruit spurs and carryover of diseases and insects were about normal. Frost has thinned the prospective set slightly but not enough to damage the outlook. Being under irrigation the ground water is also about normal. Also all tracts have been well cared for.

Practically all plantings except those two and three years old have been bearing for several years. The Kittitas Highline Canal will irrigate several thousand more acres of land apparently suited to apples and pears. Twenty-five temperature stations have been established in this area to determine as accurately as possible which, if any, areas should be avoided because of temperature factors. From previous experiences this may save thousands of dollars by preventing the planting and developing of orchards in locations where frost makes profitable production impossible.—W. O. Passmore.

Skagit County. Some 300 additional acres of strawberries will come into bearing this spring. On the tree fruits scab and oyster shell scale are too prevalent, and there is some lecanium.—C. H. Bergstrom.

Whatcom County. We have mostly home orchards of apples and pears. The principal varieties of apples in this county are Gravensteins, Kings and a few Delicious. Bartlett pears predominate, with a very limited planting of Anjou. What fruit trees we have in the county are looking healthy as regards to fruit spurs. Last summer the drought did not seem to affect our fruit business very much. We do not have blight in our trees out here but we do have scab, oyster shell scale, lecanium scale and cherry fruit fly.

We have had a very heavy rainfall in the last two months which I think will give us sufficient moisture unless we have an exceedingly dry summer. I regret to say our orchardists seem to follow the line of least resistance with reference to caring for home orchards. We do not have many new orchards, most of them are old plantings and in the early days the nurserymen came through the district and sold farmers promiscuous varieties, so their plantings are not altogether what they should be.—H. B. Carroll, Jr.

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Frank Street, manager of the noted Kentucky Cardinal Orchards, used 3000 pounds of seed in the company orchards. The Eblen Peach Orchards, approximately 120 acres, is largely sowed in lespedeza.

A little farther south in Hopkins county, the fruit men have been pleased also with results from lespedeza in checking weeds and soil washing.—David I. Day.

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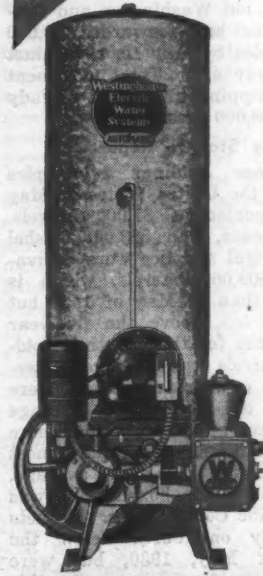
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THE MONTHLY FRUIT and VEGETABLE REVIEW

By PAUL FROEHLICH
BUREAU OF AGRICULTURAL ECONOMICS

TWO CONDITIONS were very noticeable in fruit and vegetable markets during May. One was the great increase of carlot shipments over the corresponding period last season when drought was already showing its effects. The other noticeable feature was the apparent lack of demand for many important products and the generally low level of prices.

Compared with last spring, shipments of potatoes, lettuce and all citrus fruits have recently been much heavier. Great shortages, however, have been noticed in the movement of strawberries, tomatoes and early onions, when compared with a year ago. The lighter shipments of tomatoes have been due to the poor crop in Florida, and a cool unfavorable spring delayed berries and onions in the South. But the season was rapidly catching up, and supplies of all products during June are expected to be quite liberal. More than 3000 cars daily were being shipped in mid-May.

The California shipping season opened early. Cherries and cantaloupes were moving to market very freely, and other California fruits will soon become active. By May of 1930, Florida citrus fruits were practically off the market as a result of the fruit-fly quarantine. This spring, however, both oranges and grapefruit are in abundant supply.

Berry Movement at Peak

As a rule, the peak annual movement of strawberries comes around the first of June, and this year probably will be no exception. Because of drought-reduced crops in the intermediate sections last season, the peak shipments of 1930 came as early as May 10. Total forwardings by rail to May 10 of the present season were 6700 cars, compared with 6930 to the same time last year.

Prices were well maintained during most of the Louisiana shipping season and the early part of the North Carolina season. Returns in Louisiana alone to the first of May had exceeded \$5,000,000. However, when shipments from all producing States began to exceed 225 cars daily, prices dropped very quickly. Twenty-four pint crates declined to an average of \$1.70 on the Louisiana f. o. b. auctions, and the 32-quart crates were returning growers in North Carolina \$2-\$4.50, depending largely on variety and condition. On one day, Monday, May 11, total shipments by rail reached 460 cars. City values declined greatly under the heavy arrivals.

The production estimate of berries in the second-early States has been reduced to 53,568,000 quarts, or 3% less than last year. The nine intermediate States expect 55,885,000 quarts, a reduction of 12% from their 1930 crop. Missouri expects a good crop of 14,000,000 quarts.

Apple Movement Waning

Shipments of apples had decreased to only 90 cars daily by mid-May, with five-sixths of the output coming from the West. Eastern fruit had become very scarce, but prices showed no material advance. In fact, there were signs of slight weakness at important shipping points. Best Baldwins in bushel tubs were returning \$1.75-\$1.85 in western New York, and

Extra Fancy, medium to large Winesaps brought only \$1.40-\$1.60 per box in the State of Washington. Prices were considerably lower than last spring—fully one-fourth lower in the Pacific Northwest. Movement from Idaho had not quite equaled that of last season, but Washington and Oregon together had forwarded 49,500 cars of apples by May 10, as against 35,700 a year ago. Total movement from all shipping areas had already exceeded 108,000 cars.

May Storage Report

Cold-storage holdings of apples throughout the United States on May 1 were reported as 87,000 barrels, 3,684,000 boxes, and 583,000 bushel baskets. Total supplies were equivalent to 1,509,000 barrels, which is 16% more than in May of 1930 but only about 5% above the five-year average figure for this month. Holdings in barrels were scarcely two-fifths those of a year ago and were only about one-fifth of the average figure. Boxed apples were 50% more abundant than last spring and almost 50% above the five-year average. About 63% of the boxed fruit was still in Pacific Coast States. Baskets were nearly one-fourth below the holdings of May, 1930, but were slightly greater than average for this time of the year.

Citrus Movement Heavy

Florida citrus is so abundant this season that final shipments, including mixed cars, are now expected to reach 75,000 carloads. During the first full week of May, California orange shipments increased sharply again to 2025 cars, as against 820 a year ago. Florida orange movement decreased to 970 cars for the seven-day period. However, the output of Florida grapefruit increased to 955 cars, and light shipments came from California, Arizona and Porto Rico. Only about 30 cars of grapefruit moved during this same week last season. Florida fruit was in a relatively strong position in city markets. Terminal auction prices of grapefruit recently averaged \$2.55 per box, and Florida oranges averaged \$3.75.

At the present time, prospects for the coming crop of citrus fruits in California, Arizona, Florida and other southern States are quite favorable. It is too early, however, to make any production forecasts. Good crops of citrus seem to be in prospect in any event, because of the new acreages and the increased productive capacity of bearing groves, particularly in Texas and Arizona.

Good Crop of Peaches

Peaches in 10 southern States are reported to be in very good condition, except in Oklahoma and Texas where spring freezes did considerable damage. Georgia and North Carolina expect very good crops. Last year, Arkansas had only 84,000 bushels of peaches, but the coming season that State looks for a crop of over 3,000,000 bushels. The five-year average for Arkansas is 2,373,000. For the entire group of 10 States, May 1 condition of this crop averaged about 71% of normal, compared with 45% a year ago and a six-year average for May of 65%.

These conditions indicate that southern production this year may

reach 18,000,000 bushels or more, which compares with 10,173,000 bushels estimated for these States last year. The largest previous production was in 1928, when the estimated crop was 21,353,000 bushels. First carlot shipments from Georgia were expected before June 1. Cannery peaches and freestone peaches in California will probably make large crops again this season, although probably less than last year.

Other Fruit Crops

Except for a shortage of moisture in a few localities, California deciduous fruits show generally good prospects. Pears and plums are likely to yield good crops. Grape prospects are still uncertain. Cherries may give a crop of 22,000 tons in California, or 4000 more than last season. The late April freeze is estimated to have reduced by 17% the production prospects for soft fruits and apples together in the Yakima Valley of Washington. Strawberries in the Northwest also suffered to some extent.

Potato Prospects

Total acreage of the commercial potatoes in the early and intermediate States together is now expected to be 356,190 acres, or 6% more than last year. This would be the heaviest planting since 1928 and only 10% below the record acreage of that season. With better yields expected in Florida this season, the commercial early crop in that State was forecast at 3,140,000 bushels, against 2,480,000 in 1930. The gain was entirely in the northern part of the State. The lower valley of Texas expected only 778,000 bushels, compared with 1,530,000 last season. Condition of the entire early crop in May was around 79% of normal, compared with 74% a year ago. Commercial production in the eight earliest States is forecast at 15,831,000 bushels or one-fifth more than in 1930.

March reports of growers' intentions to plant potatoes indicate a total increase for the United States of about 11% over last year's harvested acreage. Under average growing conditions, such an acreage could easily produce between 400,000,000 and 430,000,000 bushels of potatoes, which doubtless would mean lower prices than during the season now closing. The 1930 crop was only 361,000,000 bushels.

New Potatoes Active

By mid-May, total forwardings of new potatoes were averaging over 300 cars daily. Florida had passed its peak, and the season was nearing an end in the lower Rio Grande Valley of Texas. Alabama and Louisiana had become very active. Other districts of southern Texas were expected to begin shipping during the latter part of May, and Georgia and South Carolina will soon be prominent.

Prices declined sharply, as shipments attained a heavy volume. Sacked Bliss Triumphs reached \$1.50-\$1.65 per 100 pounds at lower Rio Grande Valley points, and best Spaulding Rose dropped to \$2.50 per barrel in Hastings section of Florida. Early sales around Mobile, Alabama, were being made on a dull market at \$1.35-\$1.50 per 100-pound sack. There seemed to be lack of a real demand in the potato markets, though a slight improvement occurred for old potatoes in southern Idaho and in Wisconsin and northern Maine. Movement of old stock still filled 450 cars daily and was nearly 50% heavier than a year ago. The seasonal output from the 19 leading main-crop States had caught up with last year's corresponding figure and had begun to exceed the 1930 total to date. F. o. b. values of old potatoes were scarcely half those of last spring, and new stock showed a proportionately low level, compared with 1930.

COSTS IN PRODUCING APPLES

By H. R. NISWONGER

THE AVERAGE COST of growing and harvesting a bushel of apples in 1930 in the Brushy Mountain section of North Carolina was 50 cents. This cost includes—Growing the fruit to maturity, 23 cents; picking the crop, five cents; and overhead charges, 22 cents. Overhead charge included five per cent interest on the sale value of the investments, taxes and depreciation on equipment. The above figures were computed from records sent in by four apple growers who had a total of 7250 trees of ages eight to 20 years, which yielded 7530 bushels of apples. The varieties in these orchards consist largely of Limbertwig, Delicious, Stayman and Bonum. The yield of a fraction over one bushel per tree was far below the average due to damages caused by cold weather and the blight disease.

The total cost of growing the fruit to maturity was \$1743.84, divided as follows: Labor costs—Pruning and hauling brush, \$84; cultivating and mowing cover crops, \$248.40; applying fertilizers, mainly nitrate of soda, \$31.50; sprayings (four), \$329.75.

Total labor costs, \$693.65. Cost of spray materials—Lime-sulphur for dormant and summer sprays, \$305.20; arsenate of lead used in controlling codling moth, \$136.62; blue stone (copper sulphate) and lime for making Bordeaux mixture, \$127.55; nitrate of soda and fertilizer for cover crops, \$481.12, making a total cost for materials of \$1050.19.

Another orchardist in Henderson county who harvested 2500 bushels from 500 fourteen-year-old trees grew the crop to maturity at a cost of \$340 or about 14 cents per bushel. Harvesting and overhead charges are not included in the 14-cent cost per bushel. Individual cost items are as follows: Pruning and hauling brush, \$16; cutting out tree borers, \$4.50; mowing weeds, \$8.50; applying nitrate of soda, \$3.50; sprayings (seven), \$70; nitrate of soda, \$40; and spraying materials, \$197.50. The varieties in this orchard consist largely of Delicious and Stayman. The trees are of normal size and have received the best of care since they were set out.

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The Marketing of Farm Products. By L. D. H. Weld. Explains the general organization and methods of farm marketing and treats of special problems, such as future trading, inspection and grading, cooperative marketing, etc. 499 pages. \$2.25.
Commercial Fruit and Vegetable Products. By W. V. Cruess. A thorough treatment of the application of scientific principles to the manufacture and preserving processes of direct value to commercial canners and others in the operation and control of their plants. 515 pages. Illustrated. \$4.50.
Books sent postpaid on receipt of price. 5% Discount on 2 or more books.
AMERICAN FRUIT GROWER,
1105 Merchandise Mart, Chicago.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912.
of American Fruit Grower, published monthly at Chicago, Ill., for April 1, 1931.

State of Illinois) ss.
County of Cook) ss.

Before me, a notary public, in and for the State and county aforesaid, personally appeared Harry W. Walker, who, having been duly sworn according to law, depose and say that he is the business manager of the American Fruit Grower, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher—International Trade Press, Inc., 1105 Merchandise Mart, Chicago, Ill.
Editor—Chester G. Campbell, 1105 Merchandise Mart, Chicago, Ill.
Managing editor—None.

Business Manager—Harry W. Walker, 1105 Merchandise Mart, Chicago, Ill.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) International Trade Press, Inc.; C. A. Tupper, H. M. Sisley, Harry W. Walker, James E. Montgomery, Joseph E. Browne, all at 1105 Merchandise Mart, Chicago, Ill.; Chas. W. Price, 250 Park Ave., New York City; E. G. K. Melster, Standard Bldg., Cleveland, Ohio; Superior Printing Co., 203 W. 26th St., New York City; Elmer Quitsau, Chicago, Ill.; A. K. Mercer, 211-27 25th Ave., Bay Side, N. Y.; Mrs. Margaret E. Sampson, Bridgeport, Conn.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent or more of total amount of bonds, mortgages, or other securities are: Chicago Trust Co., 134 S. LaSalle St., Chicago, Ill. (as Trustee).

4. That the two paragraphs above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

HARRY W. WALKER,
Business Manager.

Sworn to and subscribed before me this 24th day of March, 1931.

(Seal) A. C. RAMBERGER,
Notary Public.

(My commission expires Aug. 10, 1933.)

TRAINING BUGS TO FIGHT BUGS [From Page 6]

minimum. To baby ladybugs the eggs and the juice of the mealy bug larvae are what milk is to human babies, but the grown-up bug will condescend to dine upon various forms of plant lice if there are no mealy bugs at hand. However, it is only a matter of education to make the mealy bug the sole article of diet of the ladybug.

The Essigs lay claim to having developed the largest parasite police training industry in the world. They have devoted a large portion of their lives to the study of bugology and they know the habits, whims, temperaments and diseases of their broods as thoroughly as the chicken raiser knows his poultry. If a billion or so of the ladybugs contract pneumonia, infantile paralysis, or whatever it is that naturally reduces the bug population, and pass on to the bug heaven, it is a serious loss, for each full grown ladybug is worth three-quarters of a cent. Therefore, the Essigs are careful to protect their charges from drafts and contagion, for one little puff of chill breeze might wipe out the entire school.

It has been estimated that it takes 2,500,000 ladybugs to keep 500 acres of citrus trees free from pests. Dining on 250,000,000 mealy bugs is just a day's picnic for 10,000,000 ladybugs, but one such banquet merely scratches the surface in orchard pest control because one normal mealy bug may give rise to a progeny of 3,216,280,000 in a single year. The female lays her eggs beneath a downy covering, from which hatch out little active six-legged larvae, which wander about and soon begin to form a new downy scale. Each female mealy bug lays from 100 to 3,000 eggs, and on her nest the mother dies, leaving the cottony part of her body spread over the eggs. This is called scale. The life cycle of the scale insect is so short that in a few months an entire orchard becomes infested with the progeny of one bug.

The Essigs have made the raising, training and delivering of ladybugs as simple as chicken raising. Since their principal object is to teach the ladybugs to eat nothing but mealy bugs, they must first see to it that

they have an abundant food supply. This, too, is simple.

Potatoes are planted in trays and placed in darkened rooms, and when the shoots are about a foot tall a flock of mealy bugs is liberated in the rooms. These bugs, feeding and breeding on the potato plants, multiply almost as amazingly as in the orchards and in two or three weeks one cannot see the potato plants for bugs.

Into this mealy bug hatchery several thousand adult ladybugs are released. The female ladybug deposits her eggs in the cottony nests of the mealy bug and their larvae hatch amid the hatching mealy bugs, with plenty of living food all around. When the larvae in the first nest are devoured, the fat ladybug larvae crawl around until they find other nests, and so the slaughter of the mealy bugs, which at the same time fixes the dietary habits of the ladybugs, goes on until the time comes for the ladybug larvae to pupate. From the pupae come the adult ladybugs, and these are delivered to the orchardists and farmers.

Adult ladybugs are collected for shipment soon after emerging from the pupal stage. As the room is dark, the ladybugs fly to the windows. There they are gathered and put into capsules in squads of 10 to 25 and delivered to the orchardists in 1000-capsule lots. As soon as they are liberated in pest-infested trees or vines, the female ladybugs hunt around for cottony nests and in them lay their eggs as their mothers did on the potato plants in the hatchery.

When once a flock of thoroughly educated ladybugs has been put to work in an orange or lemon grove, the worries of the orchardist are over, for the future generations of ladybugs inherit the dietary education and continue the work of their ancestors. That is why all ladybugs are respected. They are all either college trained or descendants of graduates since the first ones imported went immediately to school. The insectarium maintained by the Los Angeles County Board of Supervisors liberated about 10,000,000 trained ladybugs during the year 1930.

AN APPLE POLLEN TEST

By HOMER DYE

GUESTS at the apple blossom celebration April 22 in the orchard of Mrs. Joseph Weston, near Belton, Mo., were surprised to find large bouquets of blossoms hanging in trees which were heavily laden with their own blossoms.

It was another step in horticulture. Orchardists go to the annual demonstrations to exchange ideas. Three hundred attended.

The purpose of the bouquets was explained by T. J. Talbert, head of the horticultural department of the University of Missouri. They were placed in Mammoth Black Twig trees. That variety of apples will not pollinate itself, Professor Talbert explained. For many years Mrs. Weston had a heavy bloom on her Black Twig trees, but did not get any crops. Other orchardists experienced the same trouble with varieties of Wine-sap. Then it was discovered that these varieties are self sterile and consequently need to be pollinated.

This year, as an experiment, blossoms were cut from Lansinburg apple trees in another orchard and hung in the Black Twig trees in Mrs. Weston's orchard. Honey bees are expected to carry pollen between the blossoms and complete the work.

Within a few weeks the orchardists can learn the result of the experiment. Then the planting of another early blooming variety with the non-pollinating varieties may insure crops.

Another step toward solving the pollination problem was demonstrated by the presence in the orchard of hives of bees. The bees in obtaining honey spread the pollen from blossom to blossom. George Ashbaugh, foreman at the orchard, demonstrated bee handling.

Mrs. Weston's success in managing her orchard has been such that a year ago she was named "master farmer," the first woman in the country to win that designation.



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- 3 Saves time
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Made Easier by using the Todd Perfection HOSE SWIVEL. Postpaid \$3.00.

New labor, time and temper-saving device for use between hose-coupling and spray gun. Allows free motion of gun in any direction. Hose cannot kink! The stuffing box joint cannot leak under high-pressure. Very compact, light in weight. Users say lessened muscular effort pays for swivel in day's use. Used by many State Agricultural Colleges and Experimental Stations. Fruit growers' supply dealers write for preparation.

A. B. TODD & CO.
Dept. A
VERMILION, OHIO

Grow Fruit in Warren County

Here the climate and soil are especially adapted for fruit. Peaches, Pears, Plums, Melons, Grapes, Figs, Pecans, Strawberries and other berries thrive. Learn about the diversified farming opportunities in our Healthy Hills. Write Dept. A-10, Chamber of Commerce, Vicksburg, Mississippi.

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TEN ART PHOTOS OF YOUR FAVORITES SIZE 11x14 INCHES FOR \$1.00 DEALERS WANTED

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AMERICAN FRUIT GROWER

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A PROFITABLE HABIT
Read these classified ads each month. Answer those that interest you. It's a profitable habit. You may do business with our advertisers with full confidence of a square deal. Use an ad yourself whenever you have something to sell or want to buy something. Send your ad now.

HARRY K. GOODALL, C. A. M., AMERICAN FRUIT GROWER, MERCHANDISE MART, CHICAGO



"I Must Answer That Ad. It's Just What I Want."

ADVERTISERS-ATTENTION

LET US HELP YOU WITH YOUR CLASSIFIED Advertising problems. Tell us what you want to accomplish and let us write a snappy classified ad for you without charge. If it suits you, run it in AMERICAN FRUIT GROWER at the regular rate. No obligation, so write fully today to Harry K. Goodall, Classified Advertising Manager, AMERICAN FRUIT GROWER, Merchandise Mart, Chicago.

AGENTS WANTED

AGENTS—DELICIOUS SOFT DRINKS IN CONCENTRATED FORM! Each 25¢ bottle makes 32 glasses. Eight popular flavors. Tremendous demand. Wonderful chance to make \$15 profit a day. Particulars free. ALBERT MILLS, 8999 MONMOUTH, CINCINNATI, O.

THE ABOVE ADVERTISER SAYS: "WE HAVE secured high-class representatives in various localities where formerly we had no representation. AMERICAN FRUIT GROWER has proved itself a valuable advertising medium."—(Signed) Albert Mills, President.

HIG MONEY SELLING SHIRTS, TIES, UNDERWEAR, 60c. Baltimore, Covello, Fante, Playhouse. Outfit Free! Experience unnecessary. NIMROD CO., Dept. 162, 4922-28 Lincoln Ave., Chicago.

BABY CHICKS

15 VARIETIES OF PUREBRED BABY CHICKS to up. 100% guaranteed. 250-351 egg WORLD'S RECORD breeding. Send for FREE catalog. State number and breed of chicks wanted. Fred Beckmann, Box 57Q, Grand Rapids, Michigan.

BEES

HONEY, MONEY, PLEASURE IN KEEPING BEES RIGHT. You can keep bees better and make money by using correct methods. This month is the time to begin beekeeping right. Let us tell you how. Ask for our free booklet, "Bees for Pleasure and Profit," or free leaflet, "Transferring Bees." Get our guarantee to make you a successful beekeeper—if you will do your part. Address A. I. Root Company, 516 Liberty St., Medina, Ohio, oldest and largest bee and bee-supply house in America.

BEE KEEPERS—ATTENTION. "YOUR MAGAZINE has opened a new field for our products," writes Citronella Bee Co. "The results were beyond our expectations. It was the first time we ever advertised in other than Bee Journals." Mr. Bee Man, you should use a classified ad in our next issue. Send it in today.

PACKAGES BEES FOR THE FRUIT GROWER. 2 lb. pkg. with queen, \$2.00 each; 3 lb. pkg. with queen, \$2.50 each; 4 lb. pkg. with queen, \$3.00 each. Guarantee safe arrival to station. Address to John St. Romain, Marksville, La.

THREE BAND ITALIAN BEES. 2 LB. PACKAGES, \$3; 3 lb. packages, \$3.50 each. Young Mated Queens, 35 cents each. Any Amount. D. C. Jackson, Funston, Ga.

BOOKS FOR FRUIT GROWERS

THERE IS A BOOK FOR YOU ON ANY PHASE OF the fruit growing industry. We have them all. Send for a complete list or order one or more of the following direct from this ad:

"Merchandising Fruits and Vegetables" by Sherman, 499 pages, 26 chapters, \$4.00 postpaid.
"Manual of Fruit Diseases" by Hesler and Whetzel, 462 pages, 124 illustrations, \$3.50 postpaid.
"Fundamentals of Fruit Production" by Gardner, 688 pages, 70 illustrations, \$4.50 postpaid.
"Principles of Fruit Growing" by Bailey, 432 pages, 186 illustrations, \$3.50 postpaid.
Save 5% by ordering 2 or more books at once. Tell your friends. Write today. AMERICAN FRUIT GROWER, Book Department 6C, Merchandise Mart, Chicago.

Tell YOUR Want to 250,000 Fruit Growers for only 20 cents a word

"Results very satisfactory" is the consensus of the advertisers in these columns. That is why you should use an ad here in the very next issue.

Surely you have something to sell that our readers want or want something that they can supply. Tell them about it here next month.

The cost is small—only 20 cents a word—minimum 18 words, \$3.60, payable in advance. You can save 5% by ordering three insertions or save 10% by ordering six times, payable with order.

WRITE YOUR AD HERE

Mr. Goodall, C. A. M. Date _____, 1931.
AMERICAN FRUIT GROWER,
1105 Merchandise Mart, Chicago.

Please insert my ad above in AMERICAN FRUIT GROWER _____ times commencing with the July issue which I understand goes to press June 20 and

will be in the hands of your subscribers by July 1. This ad contains _____ words counting name and address which is customary. I enclose remittance of \$_____ in full payment at your low rate of 20 cents a word. I prefer this under the

Classification _____

Name _____

Address _____

For Profitable Results—Fill In and Mail TODAY!

CAPITAL RAISING

"IDEAS ON CAPITAL RAISING"—BOOKLET OF interest to those having sound enterprises needing capital. We plan and write financing campaigns. Booklet and suggestions free. Write fully. THE ERNEST F. GARDNER SERVICE, 210-H Balcrow Bldg., Kansas City, Mo.

CHAIR BOTTOMS

WHITE OAK, ¾-inch SPLINTS, 1,000 FEET \$1.50. David Hardin, Pateville, Ky.

DOGS

COON, OPOSSUM, MINK, FOX, AND RABBIT hounds cheap, shipped for trial. Free literature showing pictures and breeding. Kentucky Coonhound Kennel, Kevil, Kentucky.

THE ABOVE ADVERTISER WRITES: "OUR RESULTS have been eminently satisfactory and have far exceeded our expectations. We believe anyone advertising in AMERICAN FRUIT GROWER will be entirely satisfied with the results obtained."—(Signed) R. H. Brummett, Manager.

"EXCELLENT RESULTS IN INQUIRIES AND REAL CUSTOMERS"

A profitable new market awaits you in this live classified department. A few months ago, a national advertiser with years of experience, tried it for the first time and has used every issue since. Now read what he says:

For several months we have been running a classified ad in AMERICAN FRUIT GROWER and have received excellent results in inquiries and real customers. We consider AMERICAN FRUIT GROWER one of the best magazines on our list, and shall continue to make use of its low classified rate and high circulation." (Signed) Southwest Gold & Silver Co., Fort Worth, Texas. By B. F. Nix, Gen'l Mgr.

You too should find AMERICAN FRUIT GROWER "one of the best magazines on your list." Take a tip from Mr. Nix and send in your ad for the July issue. Use the convenient order blank at the bottom of this page. Address:

HARRY K. GOODALL,
Classified Advertising Manager
AMERICAN FRUIT GROWER
Merchandise Mart
CHICAGO

EXCHANGE DEPARTMENT

YOU HAVE SOMETHING YOU NO LONGER NEED. Some other reader needs it and has something you do need. Tell our readers about it here in the next issue and make an advantageous trade at small cost. Use the convenient order blank at the bottom of this page.

FARMS AND ORCHARDS

OSARK ORCHARD. 160 ACRES, WITH IMPROVEMENTS, in Oregon County, Missouri, the heart of the famous Ozark fruit region. Railroad and federal highway. 5,000 Starke Bros. trees six to eight years old, handled from the beginning by an experienced orchardist. Fully developed and equipped. In pink of condition. Should yield years of profit and enjoyment to anyone interested in fruit-growing. Offered at low price and reasonable terms. For details write Pioneer Trust Company, Kansas City, Missouri.

ORCHARD—3000 APPLE TREES. 100 ACRES. Good buildings. Timber. Box 553, Windber, Pa.

FARMS WANTED

WANTED—FARMS OR BUSINESS EVERYWHERE. Cash buyers. National Brokers, 2513 Lakewood, Detroit, Mich.

WANTED TO HEAR FROM OWNER HAVING farm or unimproved land for sale. Give cash price. John Black, Chippewa Falls, Wisconsin.

MR. BLACK SAYS: "WE USE NEARLY ALL leading publications in the U. S. and Canada, when they do not bring results they are soon discontinued. You can rest assured that AMERICAN FRUIT GROWER will be one that will be retained by us."—(Signed) John J. Black, Gen'l Mgr.

FERTILIZER

NATURE'S GREATEST FERTILIZER. CANADIAN hardwood ashes, replaces what growth has extracted. Orchards; meadows. George Stevens, Peterborough, Ontario.

FOR SALE

FOR SALE CHEAP. APPLES OF NEW YORK. Grapes of New York. Address P. O. Box 68, Hilldale, New Jersey.

INCORPORATION SERVICE

INCORPORATED-DELAWARE. COST \$67 UP TO \$100,000 authorized capital. Franklin L. Mettler, 832 Market Street, Wilmington, Del. Estab. 1909.

INSTRUCTION

WANTED, ELIGIBLE MEN, WOMEN, BOYS, GIRLS, 18-50. Quality for Government Positions, \$105-\$250 month. Steady Employment; Paid vacations; Common education. Thousands appointed yearly. Write, Instruction Bureau, 259, St. Louis, Mo. (Quickly).

OF INTEREST TO WOMEN

MAKE \$6.00 DOZEN SEWING BROADCLOTH TEA aprons. Cut aprons furnished. No selling. Prompt pay. Send 35¢ (coin) for instructions. KOWALSKI COMPANY, BRENHAM, TEXAS.

QUILT PIECES—FAST COLORS, PRINT, PERCALE. Trial package—25¢ postpaid. Grant's Supply Store, Warsaw, Illinois.

ORCHARD SUPPLIES

TREE BRACING MATERIALS, SEALTITE TREE-BOARDS, Dressing Galvanized Screw Hooks and Bracing Rods. Circular. Rollin H. Taber, Mount Vernon, Ohio.

OLD GOLD WANTED

CASH FOR GOLD TEETH. HIGHEST PRICES. Information free. Southwest Gold & Silver Co., Box 68V, Fort Worth, Texas.

OLD MONEY WANTED

INDIAN HEAD PENNIES—SEND DIME FOR LIST of these we pay premiums for. Numismata Co., Springfield, Mo.

A PRACTICAL DEMONSTRATION

If this were your ad, others would be reading it now just as you are reading this. This demonstrates the attention-getting value of a "display-classified" ad in AMERICAN FRUIT GROWER.

This space is 2 inches and the cost is only \$3.20 or at the rate of \$19.00 an inch. For this small sum, YOU can place your sales message prominently before over a quarter of a million live readers who need what you have to sell.

Send in your copy for a "display-classified" ad for the July issue NOW. (Smallest accepted in this style is ¼ inch costing but \$9.80—a very small amount for reaching so many real prospective customers. Address:

HARRY K. GOODALL,
AMERICAN FRUIT GROWER
Merchandise Mart, Chicago

PLANTS

CERTIFIED PORTO RICAN POTATO PLANTS, \$1.50—1000; \$4.25—5000; tomato plants from certified seeds, \$1.75—500; \$1.00—1000; pepper plants, \$1.50—1000. Prompt shipment. Roots rooted. Satisfaction guaranteed. Sims Potato Plant Company, Pembroke, Georgia.

GUARANTEED PLANTS—PROMPT SERVICE. Good delivery guaranteed. Cabbage: 500—35¢; 1,000—\$1.25; 5,000—\$5.00. Tomato, Pepper: 500—\$1.25; 1,000—\$2.00; 2,000—\$3.50. Buckeye Farms, Dept. L, Box 541, Youngstown, Ohio.

MILLIONS VEGETABLE PLANTS HARDY OUT door grown. Get our wholesale and retail prices before buying. J. T. Council & Sons, Franklin, Va.

PRINTING OF ALL KINDS

LETTERHEADS, ENVELOPES, STATEMENTS, INVICES, business cards, 1,000, \$2.75; 5,000, \$13.00. Low prices other printing. Heller Printing Co., 416 S. Dearborn, Chicago.

SALES SERVICE SPECIALISTS

LETTERS THAT ROUSE READERS INTO THE buying mood. Name your business and request evidence. JED SCARBORO, Maplewood, N. J.

Index to Advertisements

The concerns whose advertisements appear listed below are equipped to give prompt and satisfactory service to the American fruit grower. Most of them issue literature that is freely at the disposal of our subscribers. It is to the advantage of all that when writing to an advertiser you use the address exactly as it appears in the advertisement, and that you state in your letter: "I read Your Advertisement in AMERICAN FRUIT GROWER MAGAZINE."

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Will Advertise Virginia Apples

THE BOARD of directors of the Virginia Horticultural Society at an adjourned meeting held April 27 voted to adopt a plan to promote the interests of Virginia apples, by advertising and otherwise, and to raise a fund for the purpose by a soliciting subscription of two cents on each barrel of apples sold by Virginia growers.

This plan was presented by the president of the society, ex-Governor Harry F. Byrd, at the last meeting. Since then a discussion of the plan by growers, large and small, and their ready acceptance of the idea resulted, at the adjourned meeting, in favorable action by the board of directors.

Now Frozen Tangerine Juice

INVESTIGATORS at the Florida Experiment Station have found that it is possible to freeze tangerine juice by relatively simple methods. The resulting product is very satisfactory, with a flavor that is pleasing and appealing. Frozen tangerine juice has been kept in the station's cold storage plant for over four months. Just how long the juice will keep remains to be determined.

Canada Produces Variety of Fruits

COMMERCIAL fruit production in Canada in 1930 had a value of \$19,224,970. Apples, grown principally in Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia, accounted for \$10,863,940 of the total. The 1930 commercial crop totaled 3,165,936 barrels, which returned an average price to the growers of \$3.43.

Among other fruits grown in Canada last year for domestic and export markets were pears, 411,455 bushels; plums and prunes, 258,225 bushels; peaches, 759,702 bushels; apricots, 10,000 bushels; cherries, 286,000 bushels; strawberries, 12,934,555 quarts; other berries, 4,162,492 quarts; and grapes, 51,062,000 pounds.

FIRE BLIGHT AND INFESTED BEE HIVES

(From Page 10)

continued the next season just the same. There were no bees there. What happened? The pear men secured a small crop of pears because of limited pollination and they themselves asked to have the bees brought back. Since that time I have heard of no trouble between the California fruit growers and the bee men; but unfortunately Professor Rosen's article will likely start trouble again.

He says he found the blight germs in bees. As he is probably not a bee man, he perhaps did not know that several generations of bees would take place between the previous blossoming time and the blossom time of the next season. The chance of the last generation of bees carrying the blight the next spring, would be very remote except that they might carry it from the hive. They would not be likely to get it from the honey for the reasons already pointed out. As the combs would contain honey or be in contact with it, the germ would not be in the wax. The only source left would be the pollen and the wood parts of the hive. The pollen of the previous season would, in all probability, be consumed by this time.

The only thing left would be the hive. I don't deny that the bacteria could be found in the hive or that a few bees might carry the infection; but the hive would have to be in a very badly blighted area to get any germs at all and this is where Rosen says he did get them.

Ever since this article was published I have given the whole matter not a little investigation. I have visited prominent horticulturists, entomologists and plant pathologists. They all feel that Rosen's article is premature, especially as he draws conclusions from too many ifs or provisos. He says, "If such blighted blossoms," etc. Again, "Was it possible," etc. "And unless the fruit growers of America are willing to take the initiative in requesting a thorough investigation of this disease and demand sufficient funds from the State legislature and the United States Congress for the prosecution of such studies, most of those who grow susceptible varieties will probably be driven out of business of growing apples or pears on a commercial scale." This is a scare line surely. It sounds as if more work should be done. He admits, "The writer's evidence is not as yet com-

plete," etc. If more research work is needed and if his "evidence" is "incomplete," why kill the goose that lays the golden egg by laying a large part of the blame on the bees that most horticulturists feel are the fruit growers' best friends? If the evidence is incomplete why say, "The problem of control involves among other things the maintenance of uninfected bee hives and the failure to recognize this must, at least in part, account for the gradual extinction of the pear industry in America." Why put out such a scare until we know? Again, how is the ordinary fruit grower to tell when the bee hives are "uninfected"? No one except a bacteriologist or a pathologist familiar with this bacterium could make this determination. Who is going to pay for this expert service?

I am sorry to take issue with Professor Rosen but I thoroughly believe he has been premature in his conclusions especially when he intimates that the bees may be the means of destroying the pear or apple industry on a commercial scale. My contact with some of the leading horticulturists, some of the plant pathologists, leads me to believe that he has magnified a molehill into a mountain.

TREATED APPLE TREE BANDS

By M. A. KOELLER

A RATHER simple and economical supplementary control measure for codling moth is the treated band. In the spring of 1930 we gathered all the information we could concerning the treating of apple tree bands. The source of most of our facts was the Illinois Natural History Survey and the United States Department of Agriculture.

Single faced corrugated paper has been found to be one of the best materials to use for banding. You can purchase large rolls from the paper companies and cut them up to the desired width, or you can buy ready cut paper. If you cut them yourself, you can easily make a mitre box and saw small rolls off into four-inch strips. It is handy to have these rolls about a foot in diameter as they can be easily dipped in the treating solution when of that size. The loose end of the paper can be fastened with a small nail.

One of the best materials found by the experimenters for the treating of the bands is beta naphthol, dissolved in oil. There are two common grades of beta naphthol, flakes and powder. A different process is used with each grade, but since we used the flakes, I will describe that process.

We made a mixture of our materials at the rate of one pound of beta naphthol to one and one-half pints of lubricating oil. (We used cream separator oil, but the U. S. D. A. formula calls for common red engine oil.) This mixture was placed in an old 30-gallon oil drum, which had one head removed, and the can was put over a fire built in the open. The fire must be hot enough to keep the beta naphthol in solution. We made a wire dipping rack on which the roll of paper was placed, and it was an easy matter to lower the roll into the hot solution, where it was left just long enough to let the liquid work through it. After taking it from the liquid, the excess liquid on the roll was allowed to drain back into the can. The roll was then placed to one side to dry.

As the rolls are dipped, additional material is added to the solution, so as to keep it deep enough to cover the roll of paper.



Codling moth band around trunk of 25-year-old Jonathan tree.

Below—Cutting small rolls of corrugated paper into four-inch strips suitable for dipping.

Right—Our crude outfit for dipping the rolls of paper into the tank of hot solution. This work is best done out in the open.



After treatment, the paper is dried sufficiently in a few minutes to be applied to the trees, which should have been previously scraped. I think the scraping is most effectively done dur-

ing the dormant season, as many hibernating larvae can be destroyed. The way I applied the band was to kneel at a tree, with the roll in one hand. It was then easy to throw the loose end partly around the tree trunk, where it could be grasped with the other hand. It can then be drawn tightly to the trunk, and be secured with a small nail, such as a roofing nail. It is then easy to tear the band off from the roll, and you have used



just the amount you need. The application of the bands is not a large job, but the tree scraping is the largest task of the whole procedure. A few of our bands caught as high as 230 worms and the average was over 100.

Cost of Apple Tree Banding in 1930
At Koeller Orchards

Cost of paper.....\$12.89
Cost of beta naphthol..... 23.62



CONTROL PEAR PSYLLA

As soon as the summer infestation appears in numbers give your trees a thorough application of VOLCK or ORTHOL-K.

These Oil Sprays kill nymphs, hard shells and "flies", weaken the eggs so that most young nymphs die soon after hatching and discourage further egg-laying. Also widely used for late brood Codling Moth, Summer Scale, Red Spider and Oriental Peach Moth. VOLCK and ORTHOL-K are backed by over a quarter of a century of experience in the production of scientific insecticides.

Write for Summer Spray Bulletin

CALIFORNIA SPRAY-CHEMICAL CO.
204 Franklin Street, New York City
National Stock Yards, Ill.
Berkeley, California

VOLCK AND ORTHOL-K

IRRIGATED FRUIT FARMS PAY AT NEPEL, WASHINGTON

Moses Lake lands produce profitably good crops of apples, pears, peaches, apricots, strawberries, watermelons, cantaloupes, alfalfa, potatoes, garden vegetables. Dependable low cost irrigation from wells or lake by electric power. Twenty acres sufficient. Unimproved lands now priced low—\$50 to \$100 per acre on easy terms. Good climate, schools, markets. Write for free maps and booklets containing full information and partial lists of land for sale. Low Homeseekers' excursion fares from Central States first and third Tuesday each month. R. W. Reynolds, Commissioner, Agricultural Development and Colonization Department, The Milwaukee Road, 927-C Union Station, Chicago, Ill.

OLD COIN AND STAMP VALUE BOOK

giving descriptions and prices paid for old U. S. gold, silver and copper coins, with names of buyers, 25 cents. Mention this paper.

A. A. BARNES R HELENA, ARK.

Farm Structures. By K. J. T. Ekblaw. Practical farm buildings which have been built and tested on farms are described, with complete plans and specifications for their construction. 252 pages. 159 illustrations. \$2.60.

Farm Concrete. By K. J. T. Ekblaw. How to mix and proportion cement for the best results. How to estimate costs, how to make forms. How to use concrete in steps, fences, posts, cisterns, culverts, besides the more usual construction. 263 pages. 95 illustrations. \$2.40.

Law for the American Farmer. By John B. Green. How to take title to land; what is necessary for a contract; how insurance works. These and many other important facts that farmers need to know are explained in this book on all the legal angles of farming. 504 pages. \$2.50.

Farm Accounting. By E. L. Currier, N. J. Lennes and A. S. Merrill. Actual records kept on farms in different sections of the country are reproduced for the use of other farmers who keep their own accounts. The entire year's business for each farm is carried through in detail. 293 pages. \$1.50.

Books sent postpaid on receipt of price. 5% Discount on 2 or more books.

AMERICAN FRUIT GROWER,

Merchandise Mart, Chicago.

Cost of oil 11.00
Cost of labor of treating..... 6.00

Total cost of preparing bands..\$58.51

This cost was for 9750 feet of treated bands. If four feet are allowed for each band, the cost per band is approximately 2.4 cents. One pound of beta naphthol treated 97 feet of paper band.

AMERICAN FRUIT GROWER "WONDER TOUR" [From Page 7]

ward again, over the magnificent Cascade Range, with its canyons, rivers, waterfalls, and its forests of towering fir, cedar, and hemlock—to the Pacific Ocean at Puget Sound.

Seattle, Tacoma, Mt. Rainier, Portland, Columbia River are wonderful places, but as we are going to visit them and have already told you what to expect in previous articles—we'll skip to some other highly interesting spots that we will see on our way southward through California. There's Mt. Shasta, elevation 14,161 feet, and Mt. Lassen, the only active volcano in the United States. Then through rich Sacramento Valley, where gold was first discovered in California.

Between San Francisco and Los Angeles are famous Old Mission San Miguel, noted Paso Robles, Hot Springs, San Luis Obispo nestling in the Coast Range, and lovely, alluring Santa Barbara. As our train speeds south from Santa Barbara we can see oil being pumped from beneath the bed of the Pacific. Soon we glide into Los Angeles and you know about what to expect.

Between Los Angeles and Imperial Valley, for 40 miles, we ride along Salton Sea—a great body of salt water, below sea level, formed when the Colorado broke its banks in 1905.

From Imperial Valley en route to El Paso we pass through Yuma, home of the Yuma Indians. During this lap of our trip, we are in the vicinity of the famous Apache Trail, a region of strange and primitive beauty. Hereabouts are many wonderful desert scenes, and some of the finest cac-

tus gardens in America. In the vicinity is Tombstone, Ariz., one of the most famous silver camps of the Old West, and once one of the toughest of towns, as one gathers from the name. In the same neighborhood is Bowie, also noted in Old West annals.

The territory that will be visited and enjoyed by the members of the AMERICAN FRUIT GROWER 16-day, escorted, all-expense Wonder Tour includes a vast domain that stretches from Lake Michigan to the Pacific's blue waters at Puget Sound, then down through Oregon to sun-kissed California and on through the valleys of the Southwest into Old Mexico. Arrangements have been completed for a trip that provides for the best of everything—de luxe trains, finest meals, hotels and sightseeing trips as well as experienced travel escorts. The tour is sponsored not only by the AMERICAN FRUIT GROWER but also by three great railroads—the Milwaukee Road, the Southern Pacific, and Rock Island Lines.

The educational value of the tour alone will more than make it worth your while. But do not imagine that education alone dictated the itinerary. It's packed full of wholesome good times, of memorable sights through the picturelands of the great Pacific Northwest and California, as this and previous articles have shown you.

You can't afford to miss the wonders this trip holds. Plan now to be with the happy throng of fruit growers and their friends that departs from the Union Station on a crack Milwaukee Road train from Chicago at 10:30 Saturday morning, July 18.

For complete information and total surprisingly reasonable) mail the all-expense cost (which you'll find coupon on page 13.

MOTOR TRUCKS SPEED OKANOGAN FRUIT [From Page 6]

way, making a total of around 120 miles a day.

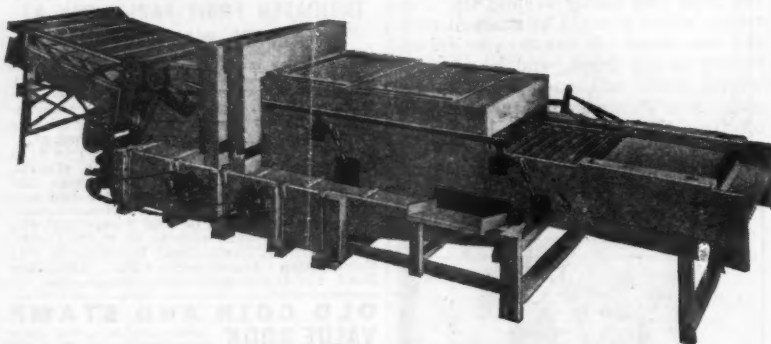
Motor trucks play a particularly important role in the transport of fruit and vegetables during the busy harvest season in the vicinity of Kelowna, a hustling city of 4500 people, some 50 miles north of Penticton. There is quite a tract of bottom land in the neighborhood of Kelowna on which various root crops, especially onions, tomatoes, etc., are grown. Truck crops help much to swell the income of Okanogan Valley farmers, the total value of these crops in 1929 being almost \$2,000,000.

Among the interviews obtained in the vicinity of Kelowna, that with J. W. Hughes is well worth mentioning. Men like Mr. Hughes refuse to follow the beaten path; they are always willing to try something new and risk their all in the venture. It was this spirit that impelled Mr. Hughes five years ago to purchase 68 acres of raw land that was cluttered with stumps and a thicket of brush on the Mission Heights Bench four miles southeast of Kelowna, clear it at considerable expense, and put in 40 acres of grapes, principally of the Concord variety. To grow grapes on such a large commercial scale in the valley was a new undertaking, but Mr. Hughes had noticed that backyard patches of grapes had been a success, the fruit ripening from a week to 10 days ahead of that in eastern sections, and so he argued to himself why should not he be able to make a go of it with a big vineyard.

That Mr. Hughes' hunch was correct is proved by the fact that he was selling his grapes at 55 cents a basket (seven pounds net) which was considerably higher than growers in Ontario and Washington were obtaining. The production of the vineyard

is now about 20,000 baskets, which will mount to 75,000 baskets when the vines are fully matured. Some 472 vines are planted to the acre, and these are spaced 11 feet apart in eight-foot rows. They are irrigated four times during the season. A big advantage in favor of growing grapes in the Okanogan Valley, said Mr. Hughes, is the fact that they are free from disease and that no spraying is required. Mr. Hughes owns a motor truck which he uses as a general-purpose hauling unit and to transport to town his grapes, the output from a 30-acre apple orchard that he rents, and other crops, among which is the crop from nine acres of cucumbers.

Another farm near Kelowna, interesting not so much because of its fruit but because of its mixed crops and purebred herd of Holstein cattle (30 head), is the 100-acre place operated by W. R. Barlee and his 30-year-old son, J. W. Barlee. Mr. Barlee came to the Okanogan 39 years ago. The crops grown on this farm are as follows: Truck crop (potatoes, onions, cabbage, etc.) 20 acres, corn 10 acres, alfalfa 10 acres, oats 20 acres, and pasture (timothy and sweet clover) 30 acres. The Barlees' motor truck is used to do a variety of general hauling for their own farm and also in the harvest season to haul crops to town for six neighboring farmers. J. W. Barlee, the son, is shown in an accompanying illustration at a warehouse in Kelowna unloading a load of fruit. The Barlees frequently exhibit at fairs some of their better stock and use the motor truck to transport the animals to and from the fairs. These animals have frequently been awarded prizes. Other up-to-date farm equipment worthy of mention on the Barlee farm is a 15-30 tractor and two big silos.



BEAN FRUIT WASHERS

The present day fruit washer should not only remove all spray residues, but all other residues from the surface of the fruit, including dust, dirt, aphids and leaf hopper blemishes, in fact, everything that detracts from the appearance of the fruit.

The buying public is demanding clean food. Bright, clean fruit creates a desire in the mind of the prospective purchaser and increases consumption. This increased consumption of apples means more satisfactory net prices to the grower.

A Fruit Washer equips you to deliver your fruit to the buyer in the most attractive possible condition. It not only removes all residues mentioned above, but imparts a beautiful finish to the natural wax of the fruit. This bright appearance should not only bring better prices, but also quicker sales, which, in years of heavy crops, is an all important factor.

All sizes and types of Fruit washers—Wipers—Brush Cleaners and Graders.

Ask for Literature on Fruit Cleaning Equipment

JOHN BEAN MFG. CO.

Division Food Machinery Corporation

15 Hosmer St.
Lansing, Mich.

104 W. Julian St.
San Jose, Calif.

SOUTHERN MICHIGAN CHERRY SURVEY

THE DEPARTMENT of Economics of the Michigan State College has been making a very close survey on the cherry industry in Michigan and the following are some of the figures relative to the cherry situation in the southwestern part of the State, from which it appears that Van Buren county has 374 cherry orchards of all kinds with 50 trees and up, in which there are 34,013 bearing trees and 26,154 non-bearing, making a total of 60,167 trees; in Berrien county 1457 cherry orchards of all kinds in which there are 68,694 bearing trees and 88,734 non-bearing trees, making a total of 157,428 trees; in Allegan county 377 cherry orchards of all kinds which have 52,830 bearing trees and 49,380 non-bearing trees, making a total of 102,210 trees. The above figures reveal the fact that these three counties have very nearly as many trees which have not yet come into bearing as they have of bearing trees.

We understand this condition applies to New York, Wisconsin and northwestern Michigan in practically the same ratio. Last year's crop

from the bearing trees in these great cherry belts in the United States amounted to 93,000,000 pounds. What is it going to amount to when all these young trees come into bearing? Allowing for mortality in the old trees, we must look forward to productions approximating 150,000,000 pounds of cherries per year. There is no use of talking, the cherry pie eaters have to redouble their efforts and eat two pieces instead of one; either that or the cherry growers have to see to it that a lot more people are interested in eating cherry pie.

More than 5,000,000 citrus trees were set in orchard form in the Lower Rio Grande Valley up to July, 1929, according to the Texas Agricultural Experiment Station in a report of a survey of the industry, in Bulletin 419, just issued. The station says that "the proportion of the acreage which is being set to grapefruit indicates that growers and shippers have found the grapefruit to be the most profitable type of citrus fruit for this region."

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